WHAT NUMBERS CAN DO

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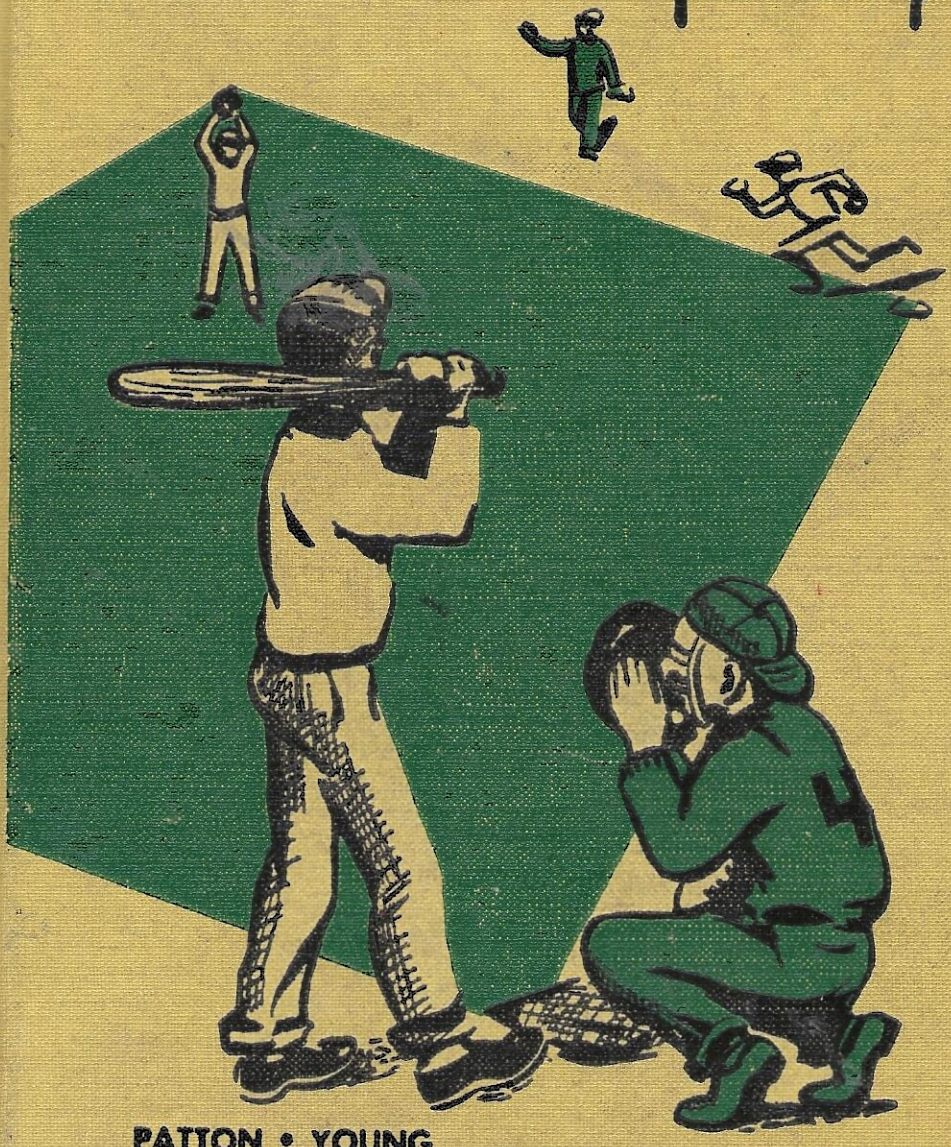

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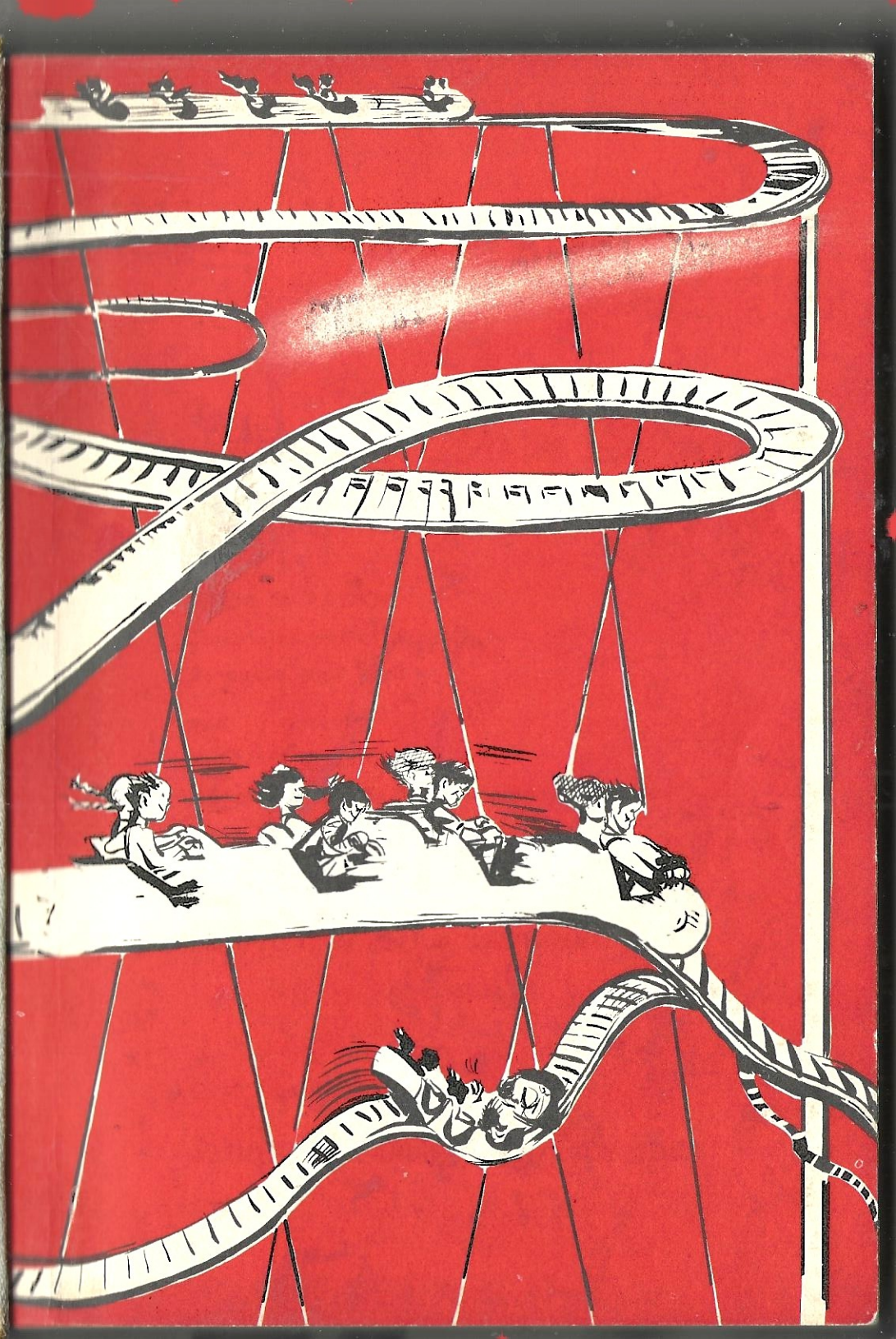

What Numbers Can Do

Numbers at Work Series

by

DAVID H. PATTON

Superintendent of Schools

Syracuse, New York

and

WILLIAM E. YOUNG

Director of Division of Elementary Education

State Education Department

Albany, New York

Illustrations by MARION HULL HAMMEL

★ ★ ★ ★ ★ ★

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To the Boys and Girls Who Use This Book

Do you shop? Do you like to make things? Do you take part in games and sports? Do you ever present plays? Do you ever cook for the family or for parties? Do you build shacks, plan gardens, help to paint a room? These are only a few of the activities in which you must use arithmetic.

This book was written just so you can have more fun and satisfaction from many of the things you do at home and at school. It is filled with the arithmetic you must know to take a big part in all the activities of every day.

Try hard this year to help yourself become better and better in arithmetic. This book will help you review all that you learned last year. It will teach you more about the things you already know and many things that are new and useful.

If you miss an example or a problem, ask yourself, "Why?" The answer may be that you did not copy the figures correctly. It may be that you did not really learn a number fact. It may be that you did not read carefully. Whatever the reason, correct your error before going on. Good foundations make good houses. Be a careful workman in arithmetic. You will be happy you took the trouble!

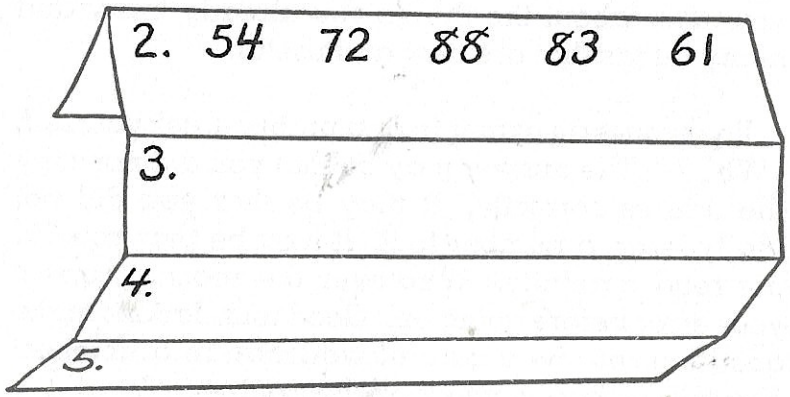
To the Boys and Girls Who Use This Book

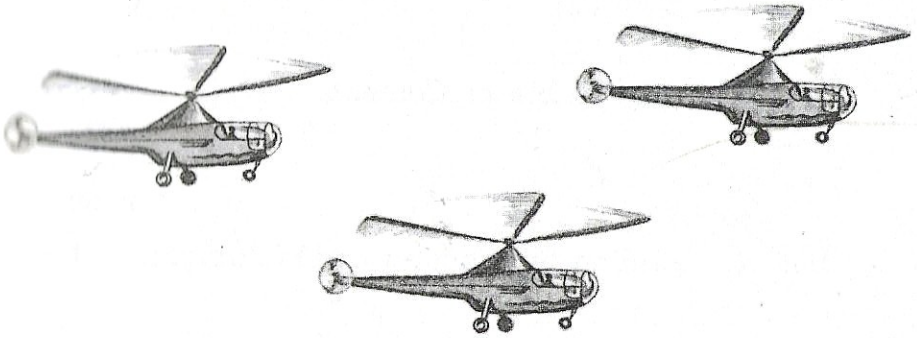
Whenever you write figures, make them as clear and neat as you can. Make them look like these:

1 2 3 4 5 6 7 8 9 0

Do not write in your arithmetic book. When you are to work examples without copying, place a sheet of paper below the first row of examples, and write your answers on it. Then fold these answers under as shown in the picture below. Write the answers to the second row of examples just below the folded edge of the paper. Fold your paper in the same way for each row. Number each row of answers. This is the way your answer paper will look when you have finished a second row of examples:

2.	33	42	45	51	30
	21	30	43	32	31





Your Chart

People enjoy competition in their games and even in their work. "May the best man win!" they say.

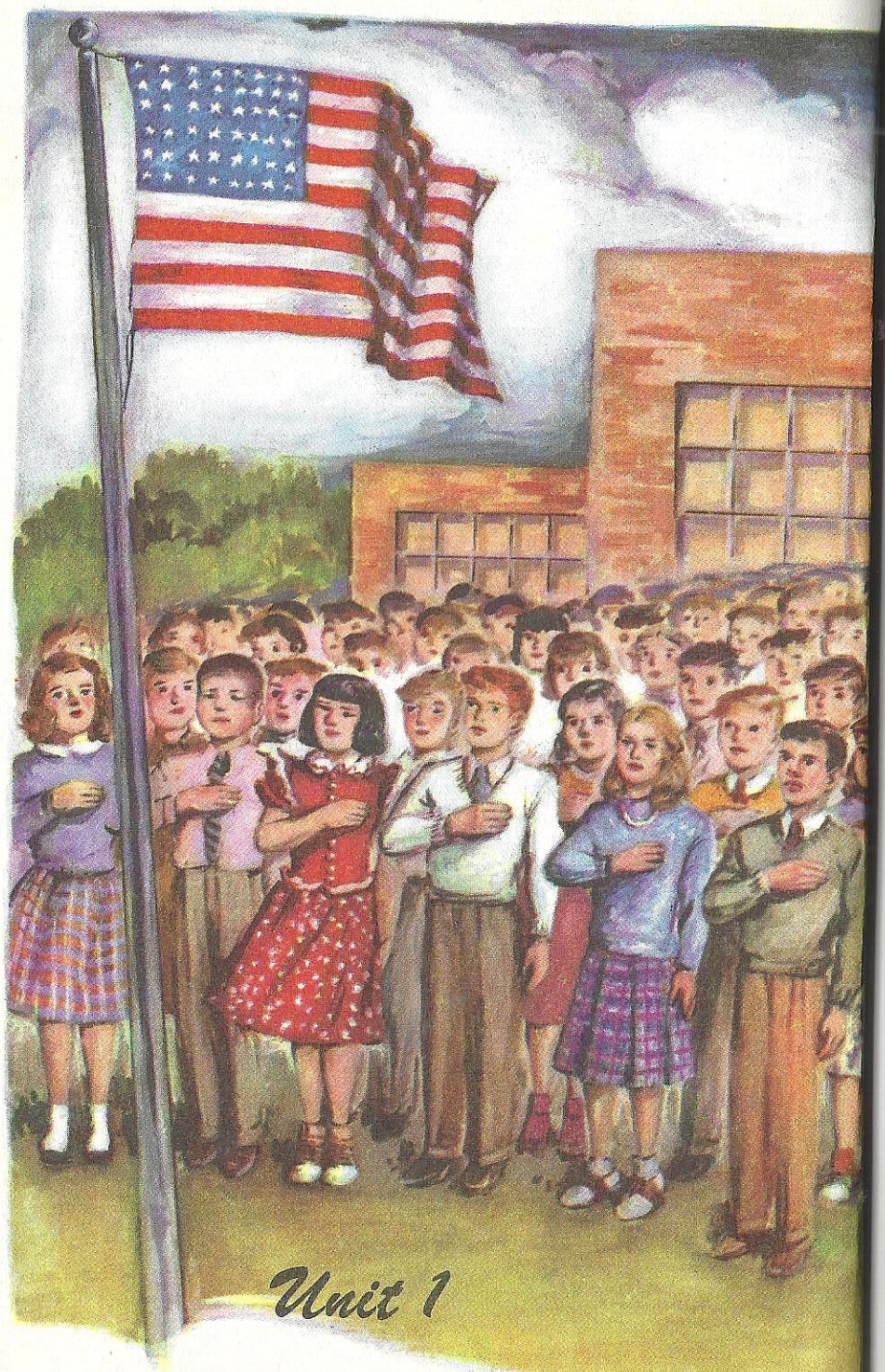
Competition with **yourself,** however, is harder and more valuable than competition with others. Are you doing better work in arithmetic this year than you did last year, this day than yesterday?

Why not win in arithmetic this year? You can!

Copy the chart started for you below. Add more rows, putting in the numbers of the rest of the pages marked with a helicopter. See if you can record more "right" answers than "wrong" answers for each helicopter page.

A helicopter makes landings that are one-hundred-per-cent perfect. Try to keep that record.

Test on page	33	61	77	85	104	108	109	116	117	124	128	136
Number right												
Number wrong												



Americans, the Free

George is hauling up our great American Flag at flag-raising time in the schoolyard. American boys and girls stand at respectful attention.

But what is an American? In the schoolyard are people with dark hair, fair hair; brown, gray, or blue eyes; dark skin, fair skin. Which are Americans? All of them.

Americans are what they are inside. Their parents or grandparents may have come from all the corners of the earth. Some Americans were born here; others, far from safe American shores. But within every American burns one splendid flame: the desire for Freedom for himself and for others.

The Flag is the picture, or **symbol**, of what America stands for. When you—fair or dark, foreign-born or American-born—consider the history of our Flag, you discover for yourself why **you**, an American, want and will work for Freedom.

Americans, the Free! Keep the Freedom flame brightly burning. The world needs its light.

Checking on Your Memory

Have you a storeroom in your home? Does your mother keep your winter clothes in it during the summer, and your summer clothes during the winter? Does she keep there things she treasures but does not often use? Is everything just waiting until it is needed?

Is that the way it is with your mind storeroom—your memory? Do you keep there in good order all the facts you are learning? Are they always ready to be used? No moths? No dust? No rust? Such things spoil valuable possessions, and sometimes even make them useless.

One wonderful thing about that mind storeroom of yours is that it has expanding walls. No matter how much you have stored in it, there is always room for a great deal more.

Let's investigate your memory. Let's see if you remember about large numbers. Read aloud:

1. The three largest states in our country are: Texas, with 267,330 square miles; California, with 158,693 square miles; and Montana, with 147,138 square miles.

2. London, England, is the world's largest city. It has 8,346,137 people. The second city in size is New York City. Its population is 7,891,957.

3. The population of the United States is 154,853,000.

4. The country of China, across the world from us, has 463,493,418 people living within her boundaries.

5. See if you can find out how many more people live in China than in the United States.

6. List these three largest Japanese cities according to population. Write the population in figures beside them.

Yokohama: nine hundred fifty-one thousand.

Osaka: one million, nine hundred fifty-six thousand.

Tokyo: six million, five hundred twelve thousand, four hundred ninety-six.

7. Is the population of London larger than that of Yokohama, Osaka, and Tokyo together?

More practice on page 354.

A Most Unusual Summer

Jim Fallon wants to be a newspaper reporter some day. He uses every chance to practice. During the first week of school, Jim was Playground Interviewer. His assignment was to find out from the boys and girls why they thought they had had a most unusual summer.

These are some of the replies he received. Answer the questions Jim is thinking about. Use your pencils only if you have to.

1. Fred Fisher: I worked to help pay for my two weeks at Camp Frolic. I earned $10.45 one month and $6.15 the next month.

"Fred earned (?)," thought Jim.

2. Linda Miller: I learned a lot about little children's ways while I took care of them. Too, their mothers paid me $.50, $1.25, $1.35, and $1.80.

"I estimate Linda earned (?)," Jim decided.

3. Ted Barrows: I spent the summer on Uncle Bill's cattle ranch. One day I watched the branders brand 115 steers. Another day they branded twice that many. You should see them work!

Jim figured the total branded was (?).

4. Mary Long: Dad is a forest ranger in Maine. I spent some time with him. Do you know that the United States has 38 national forests and that there are 36 state forests?

Jim found we have (?) national and state forests in all.

5. Phil Williams: I'm a farm boy, you know—so let's say I vacation in the country. Just before I came back to school, my brother and I filled 16 peck baskets with apple windfalls and 20 with pear windfalls. Windfalls are fruits blown to the ground by the wind. Dad uses them for hog feed.

"That was (?) bushels," thought Jim.

How Well Can You Add?

Work the examples in Row 1. Then check your answers carefully. If all five answers are right, you may skip the next five rows. If you miss an example, work all those in the column under it. Work Row 7.

If you want to work them all, you will know you have used all 100 addition facts.

	a	b	c	d	e
1.	736 357	546 363	357 584	1543 3753	5842 4979
2.	947 124	382 124	169 572	5880 6810	5333 2287
3.	149 846	352 452	278 365	3921 9417	5768 3544
4.	608 517	153 692	146 789	3346 5801	2847 6561
5.	427 359	171 65	577 98	4401 783	7089 503
6.	545 637	597 372	669 158	2813 1364	232 4868
7.	$3007.00 470.25		$122.80 1.01		$520.04 136.32

More practice on page 354.

What Does the Problem Say?

Read each problem. Answer these three questions about each of them.

1. What does the problem tell?
2. What does the problem ask?
3. What must I do to find the answer?

1. John cleared out the top drawer of his desk. In it he found 6 pencils, 4 erasers, 3 tablets, 10 rubber bands, 20 clips, and 8 crayons. How many things was that?

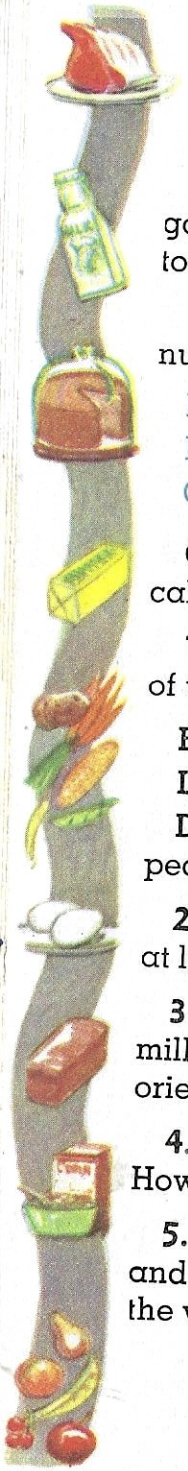
2. On our lunch table this noon there were 4 plates, 6 glasses, 2 cups, 10 spoons, 8 forks, 1 platter, and 3 serving dishes. How many things were on the table?

3. Yesterday we drove 20 miles to the city, 10 miles in the city, 6 miles to Uncle Dick's, and 26 miles home. How many miles did we drive in all?

4. There are 31 days in January; 28, in February; 31, in March; and 30, in April. How many days are there from January 1 to May 1?

5. Dad bought me a coat for $24.00, a hat for $3.00, a suit for $23.00, and a bathrobe for $7.50. How much did my new outfit cost?

6. Our classroom library has 15 history books, 20 story books, 14 drawing books, and 18 readers in it. How many books are there in the library?



Food as Fuel

Like machines, our bodies must burn fuel to keep going. The fuel is food. The **calorie** is the unit used to measure the fuel value of foods we eat.

Here is a list of some foods, together with the number of calories found in one serving of each.

Meat	: 225	Butter	: 80	Bread	: 65
Milk	: 170	Vegetables	: 40	Cereal	: 130
Cheese	: 170	Egg	: 80	Fruits	: 70

Girls and boys your age should have at least 2500 calories a day for good health and energy.

1. How many calories would you get from each of these meals?

Breakfast: cereal, milk, bread, butter, banana

Lunch: cheese, lettuce, egg, bread, butter, milk

Dinner: lamb, milk, two vegetables, bread, butter, peach

2. Add the calories for the three meals. Are there at least 2500 calories for the day?

3. Add second servings of bread, butter, and milk to the breakfast shown here. How many calories are there in this breakfast now?

4. Drink a second glass of milk for this lunch. How many calories are in this lunch now?

5. Add second servings of one vegetable, milk, and lamb for this dinner. How many calories are in the whole dinner now?

Your Food-Habits Score

Copy this chart. Score your eating habits for each day of the week. These points are not calories, of course, but the number of points are based on the calories in each food.

tomorrow

Perfect Score		Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
20	MILK 1 pt., 10 points 1 qt., 20							
20	VEGETABLES 1 serving, 5 points 2 servings, 10 3 servings, 15 Add 5 for leafy vegetable							
20	FRUITS 1 serving, 10 points 2 servings, 15 Add 5 for raw fruit							
15	WHOLE GRAIN PRODUCTS 1 serving, 10 points 2 servings, 15							
15	CHEESE, EGGS, MEAT, DRIED BEANS OR PEAS 1 serving of any one, 10 1 serving of any two, 15							
10	WATER 4 glasses, 5 points 6 glasses, 10							
100	**Total Points**							

85-100 : **Good** (but keep it at 100!)
75- 85 : **Fair** (but eat your way to **Good**!)
0- 75 : **Poor** (eat your way to **Good**!)

How Well Can You Subtract?

Work the examples in the top row across the page. Then check your answers carefully. If all your answers are right, you may skip the next five rows (not Row 7). If you miss any example, then work all those in the column under it.

If you decide to work them all, you will know you have used all 100 subtraction facts.

	a	b	c	d	e
1.	447 228	936 682	754 365	3438 734	9762 3866
2.	884 529	815 493	575 399	8105 5201	6324 548
3.	685 478	909 831	312 268	5019 1410	8341 768
4.	972 463	926 240	1097 899	10056 3221	11031 9293
5.	696 577	509 486	1163 774	4195 1594	2000 571
6.	791 106	818 371	1443 759	8053 6550	10354 9190
7.	$973.55 394.36		$876.54 456.78		$1036.25 864.05

More practice on page 354.

Finding the Hidden Question

There are **two** problems in each of these problems. Only one question is asked, but there is also a hidden question which you must find and answer first. Use this answer to help you answer the question in the problem.

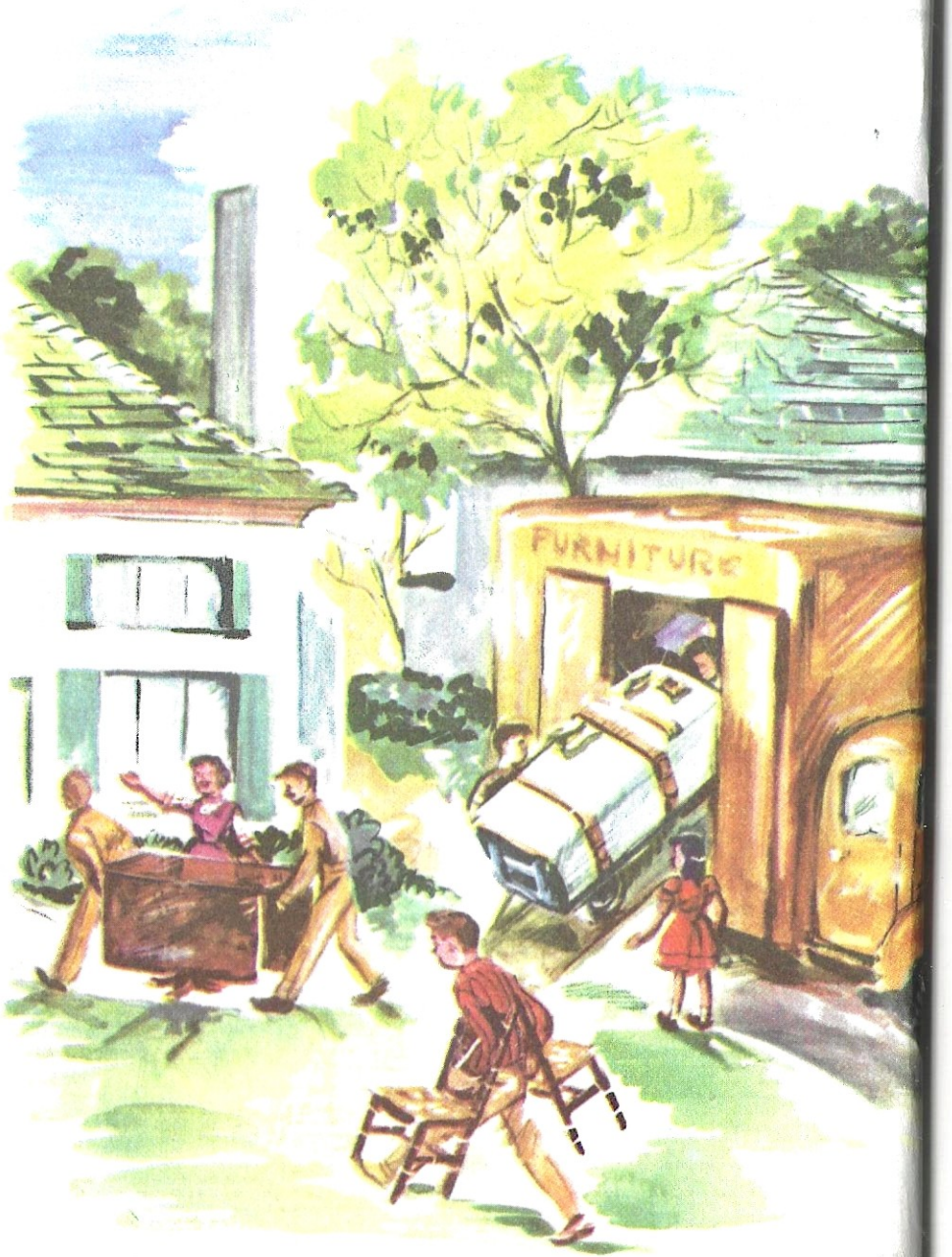
1. Peggy had saved $2.75. Then Aunt Mary paid her $2.15 for helping with the housework one week. How much will Peggy have left after buying a sweater for $3.98?

2. From the lumber in the garage, Phil chose three boards 44 in. long from which to make bookshelves. How many 22-in. bookshelves can Phil make?

3. Mr. Jackson bought a second-hand car for $885. He bought a new top for it for $45. A month later, he sold the car for $775. How much money did he lose on the car?

4. Books priced at $.75, $1.90, $3.80, and $.50 were damaged by water in Mr. Fulmer's store. A customer bought the four books for $1.50 less than they had been priced. What did Mr. Fulmer receive?

5. The Sports Club gave $25 to be spent for sports equipment. Ken bought a baseball bat for $2.20, a baseball sliding pad for $4.60, a baseball score book for $1.00, and catcher's leg-guards for $10.50. Was there enough money left to buy a catcher's mask costing $5.30?



Our New Home

I'm Mary Jane. All my life, Mother, Dad, and I have lived with Grandmother.

Now Dad has bought a new house! We are going to move into it soon!

1. The new house cost $10,000. Dad has $15,240.80 in the bank. How much will he have left if he pays for the house in one payment?

2. Dad says we must pay $63.00 for the moving van to carry our things to the house. If the movers pack all the dishes, the moving will cost $81.00. How much is the charge for packing? We aren't going to have that done.

3. Mother has bought a new rug for the living room. It cost $148. The new sofa cost $225. Our two new chairs cost $64.50 each. How much has Mother spent on the living room so far?

4. We had to have a new refrigerator that cost $235, and a table and 4 chairs for the breakfast nook. They cost $67. How much did the new kitchen things cost?

5. Dad bought a new bed and dressing table for my room. The bed cost $74.75 and the dressing table cost $32.50. How much was that?

6. Put down on paper the cost of all these things for the house which Dad must pay for. How much will be left in his bank account?

My, how happy we all are! Come and see us, won't you?

Roman Numerals

The ancient Romans used seven letters instead of our Arabic numbers from 0 to 9.

I=1	X=10	C=100	M=1000
V=5	L=50	D=500	

A number repeated repeats its value.

II=2 III=? XX=? XXX=? CC=? MMM=?

A smaller number before a larger number means that the smaller number is subtracted from the larger.

IV=4 IX=? XL=? XC=?

V, L, D are never repeated or subtracted.

X is placed before L and C only.

C is placed before D and M only.

Study this handy chart on Roman numerals:

X	XX	XXX	XL	L	LX	LXX	LXXX	XC	
10	20	30	40	50	60	70	80	90	
C	CC	CCC	CD	D	DC	DCC	DCCC	CM	M
100	200	300	400	500	600	700	800	900	1000

Write these as Roman numerals:

79 96 396 539 854 977 2610

More practice on page 355.

Just in Case You Have Forgotten

Let's multiply with a two-figure multiplier.

Multiply 287 by 54.

287
54
1148
1435
15498

First multiply 287 by 4 and write the **partial product**, 1148, with the 8 under the 4 in the multiplier.

Then multiply 287 by 5 and write the partial product, 1435, with the 5 under the 5 in the multiplier.

Add the 2 partial products.

Multiply.

	a	b	c	d	e	f
1.	364	678	745	546	489	826
	45	23	36	72	35	54

Using a Three-Figure Multiplier

Multiply 478 by 213.

478
213
1434
478
956
101814

With a three-figure multiplier, you work just as with a two-figure multiplier, but now you have one more partial product. Remember to place the first figure in each partial product under the figure by which you are multiplying.

2.	369	120	543	490	558	697
	×493	347	257	482	869	739
3.	168	269	597	758	382	696
	×469	516	169	643	465	387

This Will Make You Think

1. There are 5280 feet in 1 mile. Find out how many feet there are in 2 miles, in 3 miles, in 4 miles.

2. If it is 2640 feet from your house to school, find out by subtracting how many feet less than a mile you walk to school.

3. If you walk 2640 feet to school, do you walk a mile there and back?

4. Your Dad's store is 3960 feet from home. How much less than a mile does he walk on his way to his store?

5. If he walks 3960 feet 4 times a day, find out how many feet he walks.

6. Compare your last answer with the answers you found in Problem 1. How many miles does Dad walk a day between home and the store?

7. There are 320 rods in 1 mile. How many rods are there in 15 miles?

Magic Squares

23	12	26	15	34
31	20	14	28	17
19	33	22	11	25
27	16	30	24	13
10	29	18	32	21

1. Test to see if this is a magic square. Add the rows of figures across, then down, and then from corner to corner. If all the sums are the same, this is a magic square.

2. Make another square by adding 25 to each number in this square. Is the new square a magic square?

3. Add 326 to each number in the square above. Test to see if you have made a magic square.

Did you ever try a subtraction magic square? They are worked a bit differently. Here is one for you to try. The answers must all be the same.

That red 66 is the number to begin with for each row. Take Row 1 across—66 − 9 = 57 57 − 23 = ? Go on across Row 1. Then, in the same way, always beginning with 66, work across each row. Next, work down each row, and then from corner to corner.

66 −

9	23	22	12
20	14	15	17
16	18	19	13
21	11	10	24

Zero in the Multiplier

Do you remember what you do with a zero in the multiplier?

Multiply 567 by 50.

```
  567
   50
-----
28,350
```

First multiply 567 by 0.
Zero times any number is 0.
$0 \times 567 = 0$
Write 0 under the 0 in the multiplier.
Then multiply 567 by 5. $5 \times 567 = 2835$
Write 2835 to the left of the 0.

Multiply.

	a	b	c	d	e
1.	346	739	684	942	587
	60	40	50	70	40

If you have more than one zero in the multiplier, work the same way. Write a zero in the product for each zero in the multiplier.

Multiply.

2.	47	58	63	49	84
	30	200	300	500	300
3.	67	75	213	425	632
	2000	1000	3000	4000	5000

4. At the 5-and-10¢ store, rulers sell for 5¢ each. How much will 100 rulers cost?

5. In one term our school used 200 boxes of crayons. At 10¢ each, how much did all the boxes cost?

More practice on page 355.

Zero in the Multiplier

If your zero is in the center of the multiplier, what then?

Multiply 653 by 103.

```
  653
  103
-----
 1959
6530
-----
67259
```

Multiply by 3. $3 \times 653 = 1959$
Write this with the 9 under the 3.
Multiply by 0. $0 \times 653 = 0$
Write 0 under the 0 in the multiplier.
Multiply by 1. $1 \times 653 = 653$
Write this to the left of the 0, with the 3 under the 1 by which you multiplied.
Add.

Multiply.

	a	b	c	d	e
1.	275	389	532	712	326
	204	701	403	305	506

This is fun. If you multiply any number by 10, you just write one zero after the number.

Multiply and check to make sure.

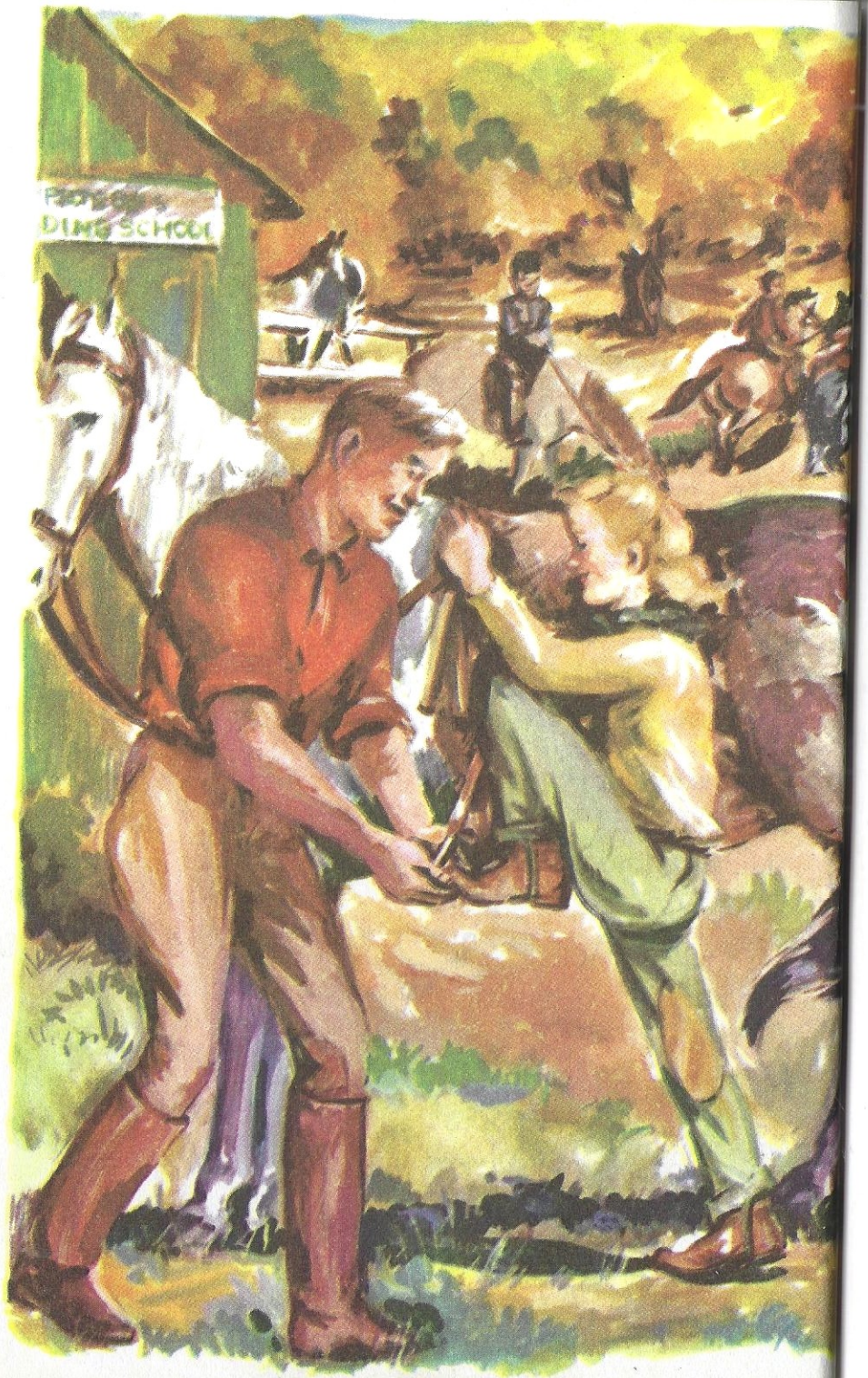
	a	b	c	d
2.	10×55	10×217	10×459	10×1679

To multiply by 100, add two zeros. To multiply by 1000, add three zeros.

Multiply.

3.	100×79	100×684	100×943	100×869
4.	1000×99	1000×456	1000×749	1000×7000

More practice on page 355.



The Riding School

Wonderful! Mr. Peters has opened a riding school near our town. He has 7 horses.

If you know how to ride, you can rent a horse for $2.50 an hour. If Mr. Peters has to ride with you to teach you, he charges $3.30 an hour.

1. Bill, Jim, and I have ridden at camp, so we don't need Mr. Peters. What will it cost the three of us to ride 2 hours? (Remember to point off two places in your answer to show cents.)

2. My sister Polly and Mary Brown rode with Mr. Peters for an hour's lesson yesterday. What did that cost them?

3. Mr. Peters says that each of the girls will need 4 one-hour lessons before he would let them ride alone. How much will the 4 lessons cost? What will Polly's share be?

4. Mr. Peters says if I can bring 4 other boys with me on Saturday, he will take $ .50 an hour off his charge for each of us. What would it cost for the five of us for 2 hours? What would the group save that day?

5. If Mr. Peters rents each horse for an average of 4 hours a day, without a teacher, how much does he make a day on each horse?

Wish I could run a riding school!

Now, How Well Can You Multiply?

Work the examples in Row 1. Check your answers carefully. If all five answers are right, you may skip the next five rows. If you miss an example, work all those in the column under it.

All of the 100 multiplication facts are used on this page. Maybe you will like to make sure you know them all by working the examples. Anyway, work Row 7.

Multiply.

	a	b	c	d	e
1.	936 12	591 25	987 236	4805 217	1675 804
2.	925 37	641 437	758 679	3456 678	4720 705
3.	908 48	430 286	832 689	2987 364	1938 309
4.	309 349	792 142	934 298	4680 5793	5684 508
5.	816 235	291 146	683 375	8607 3269	6840 709
6.	725 230	362 234	768 136	1234 789	5678 605
7.	$954.75 64		$876.57 106		$798.90 63

Problems Without Numbers

If numbers were provided for these problems, how would you find the answer to each question?

1. An airplane flies a certain number of miles in a certain number of hours. How do you find the number of miles it flies in one hour?

2. You know the weight of one bag of sugar. How do you find the weight of a given number of bags of sugar of the same size?

3. You know the cost of one milk glass. What is the cost of a dozen of these glasses?

4. Fifteen Boy Scouts collected so many pounds of old newspapers to sell for a Thanksgiving Fund. What is the average collection made by each Scout?

5. A car used a certain amount of gasoline to go one mile. How much gasoline did it use for a certain number of miles?

6. Mrs. Anderson bought a coat, a dress, a pair of shoes, and a bag. She paid a different price for each. How much money did she spend?

7. You know your Dad's age, and, of course, your own age. How can you find how old your Dad was when you were born?

8. Your mother baked a certain number of cookies. She tells you that you may have a certain fraction (or part) of them. How do you find how many you may take?

Making Change at the Bazaar

"Say, Jim!" called Al. "How did you keep from making any mistakes when you made change at the church bazaar?"

"Well, Al, I followed the system clerks use in stores. I began with the cost of the article bought and counted until I reached the sum of money the customer had given me.

"Remember the knitted cap Mrs. Dodds bought for $2.75? She gave me five dollars. So, starting with $2.75, I counted her change into her hand: a quarter, a dollar, a dollar. At the same time, I said: '$2.75, $3.00, $4.00, $5.00.'"

Tell how Jim counted out the change to customers who had given each amount under A in payment for something costing the amount opposite under B:

	A	B		A	B
1.	6 nickels	26¢	9.	$ 1.25	$ 1.05
2.	4 dimes	31¢	10.	$ 3.50	$ 3.11
3.	7 nickels	34¢	11.	$ 5.00	$ 3.98
4.	a dollar	28¢	12.	$ 5.00	$ 4.15
5.	3 quarters	55¢	13.	$10.00	$ 5.86
6.	8 dimes	72¢	14.	$10.00	$ 8.24
7.	a half dollar	38¢	15.	$20.00	$15.33
8.	2 quarters	48¢	16.	$20.00	$18.15

Remember About Multiplying the Easier Way?

Suppose you had this problem: If the Peters family drink 4 quarts of milk a day, how many quarts do they drink in a year?

You are asked to find a number of **quarts**, so your answer must be **quarts**. Right away you think, "4 quarts in 1 day, 365 × 4 qt. in 365 days."

Your example would be:

$$\begin{array}{r} 4 \\ \times\ 365 \\ \hline 20 \\ 24 \\ 12 \\ \hline 1460 \end{array}$$

You have a three-figure multiplier, and you have to find three partial products and then add.

BUT you know that $365 \times 4 = 4 \times 365$, and 4×365 is easier to find.

$$\begin{array}{r} 365 \\ \times\ 4 \\ \hline 1460 \text{ qt.} \end{array}$$

You change the places of your numbers and multiply the easier way and you call your answer quarts.

Keep "the easier way" in your mind when you have problems in multiplication; but also keep in mind giving your answers the right names.

Work these problems both ways to make sure you appreciate "the easier way."

1. If there are 8 working hours in one day, how many working hours are there in 127 days?

2. Dad rides to work on the bus. One ride costs 10¢. How much does he pay for 614 rides?

Money, Money, Money

A little child is proud to own a penny. An older boy or girl learns that dollars, many dollars, are needed for clothes, for books, for pleasures.

A man knows that he must earn all he can to care for his family. He knows he must divide his money into parts for different expenses. He must make a budget, setting aside certain sums for rent, for food, for charity, and for sickness.

Those who govern a country must spend billions of dollars. Can you think how much one billion dollars are?

Think of one dollar, $1.00. Think of a thousand such dollars, $1000. Think of one thousand thousand dollars. That is a million, $1,000,000. Now try to think what a thousand million dollars would be. That is a billion! $1,000,000,000.

Write these numbers in figures:

One thousand, six hundred dollars.

One million, nine hundred thousand dollars.

Three billion dollars.

Good Practice in Addition

First be sure and then be quick.

Give the sums as quickly as you can.

1.	29 + 8	32 + 7	34 + 5	26 + 9
2.	54 + 6	43 + 9	68 + 8	36 + 7

Add without copying.

	a	b	c	d	e
3.	6	3	7	9	5
	8	8	0	7	2
	9	6	2	6	8
	0	9	9	7	9
	2	8	7	9	6
	8	5	9	2	9
4.	26	98	68	88	97
	65	49	46	43	15
	36	77	50	56	54
	33	71	46	55	22
	73	10	63	99	40
	59	19	49	49	83
5.	$5.60	$2.33	$5.64	$9.78	$7.68
	7.91	4.30	.95	5.79	.81
	1.65	9.81	7.44	9.53	9.80
	9.65	4.87	5.93	.75	6.37
	8.17	1.03	.58	2.23	1.87
	7.06	3.40	2.87	9.36	4.69

Good Practice in Subtraction

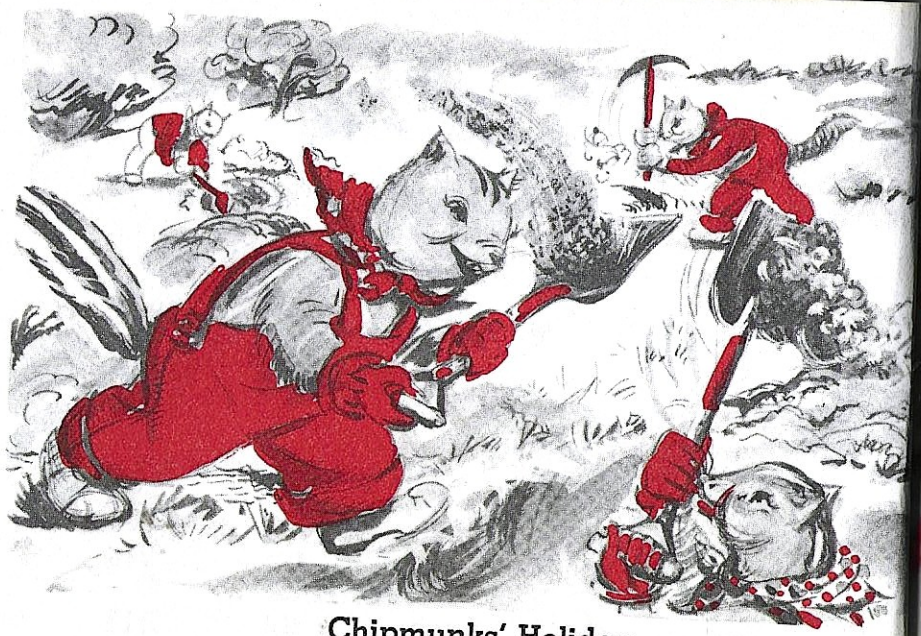
First be sure and then be quick.

Give the remainders as quickly as you can.

1.	25 − 6	30 − 7	65 − 8	52 − 7	73 − 4
2.	41 − 8	56 − 6	34 − 5	86 − 8	93 − 7

Subtract without copying.

	a	b	c	d	e
3.	102	542	629	742	861
	49	508	55	181	714
4.	523	302	500	401	118
	233	196	476	156	89
5.	6961	8327	2673	8518	6491
	1282	2786	2589	5971	655
6.	7516	9175	5339	5803	8156
	2519	7741	460	2717	1466
7.	$25.23	$20.17	$92.86	$40.27	$60.00
	9.00	13.09	35.65	28.98	46.45
8.	$93.49	$75.96	$88.29	$89.03	$82.44
	23.62	27.89	46.42	63.35	29.89
9.	$67.71	$34.79	$83.92	$54.26	$91.57
	43.90	27.56	36.15	19.57	3.91
10.	1353	5972	1003	1050	3581
	394	4286	792	625	3506



Chipmunks' Holiday

One autumn, mischievous chipmunks got into the Turner house and grounds. When the damage was discovered, Mr. Turner caught the mischief-makers alive in some special traps. The Turner boys carried the prisoners far into the woods and set them free where they could do no more harm.

"But let's see how much damage the little rascals did here," said Mrs. Turner practically.

1. The chipmunks dug holes in the lawn to reach their burrows under rocks and tree roots. It cost $39.50 to fix the east lawn. The west lawn cost $14.95 for new sod and $2.75 for new seeding. Find the cost of this damage.

2. Four camping mattresses in the attic were gnawed through. At the rate of $10 a mattress, what was the damage here?

3. Little by little, in their inner cheek pouches, the chipmunks carried away most of the nuts the Turner boys had planned to sell for $5.95. What was the loss if what the boys made on the nuts was only $1.50?

4. Mrs. Turner sprained her ankle by stepping into one of the lawn holes. A girl from the village was paid $19.50 a week for two weeks to do the housework and cooking. How much was that in all?

5. The three special traps Mr. Turner bought cost $3.00, $3.98, and $4.49. He bought another trap for $4.49 to take the place of one that broke. What was spent in all for the traps?

6. Using the answers for Problems 1 through 5, find the total cost of the damage done on that Chipmunks' Holiday.

Good Practice in Multiplication

First be sure and then be quick.

Copy and multiply the easier way.

	a	b	c	d	e
1.	60	99	57	93	94
	283	807	551	201	486
2.	80	59	75	48	67
	338	186	437	808	596

Multiply. Look out for the zeros.

3.	373	785	920	615	139
	908	890	393	705	700
4.	1234	8000	630	4900	52
	8000	1234	980	880	5600
5.	59	590	1640	5900	63000
	10	100	100	1000	1000
6.	10	100	700	1000	50000
	10	100	100	1000	1000

Multiply and remember to place the decimal point before the last two figures in your answer to show cents.

7.	$9.54	$18.96	$21.10	$43.59	$100.56
	25	39	90	85	12

Show that You Know

Add.

	a	b	c	d	e
1.	2643	3782	7144	76471	$665.21
	4577	6134	4554	30586	320.66
	2452	5353	550	6077	73.48
	2609	718	1623	470	816.32
	1747	4667	6357	6418	467.57

Subtract.

2.	9182	7364	6865	9546	$144.83
	3924	6509	4098	1599	95.94
3.	14731	16426	11394	80647	$867.10
	8925	8647	7887	53931	379.68

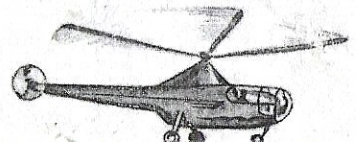
Multiply.

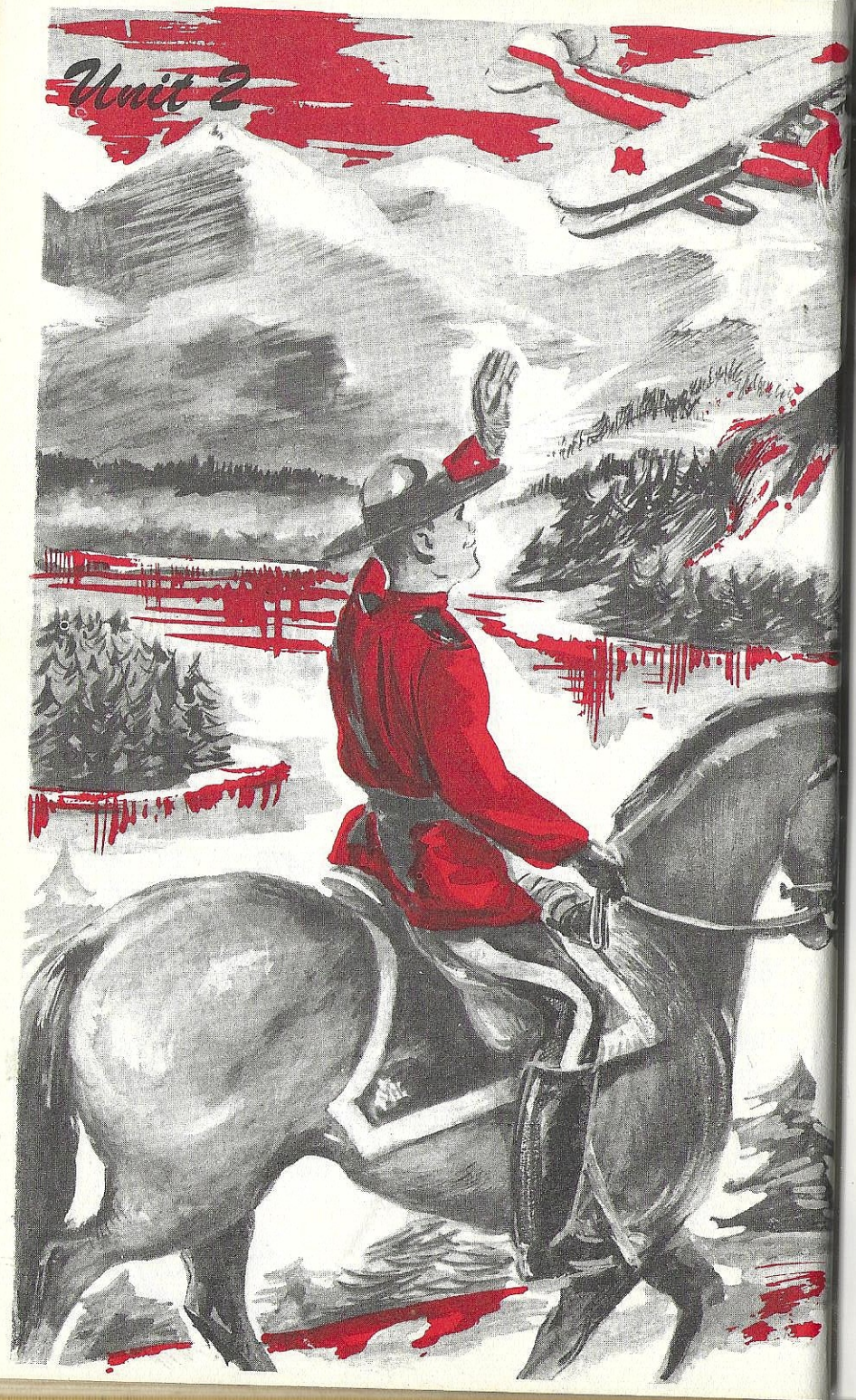
4.	659	192	779	$8.09	$8.17
	980	403	869	647	907
5.	1134	3006	4030	5476	$78.39
	120	739	985	798	609

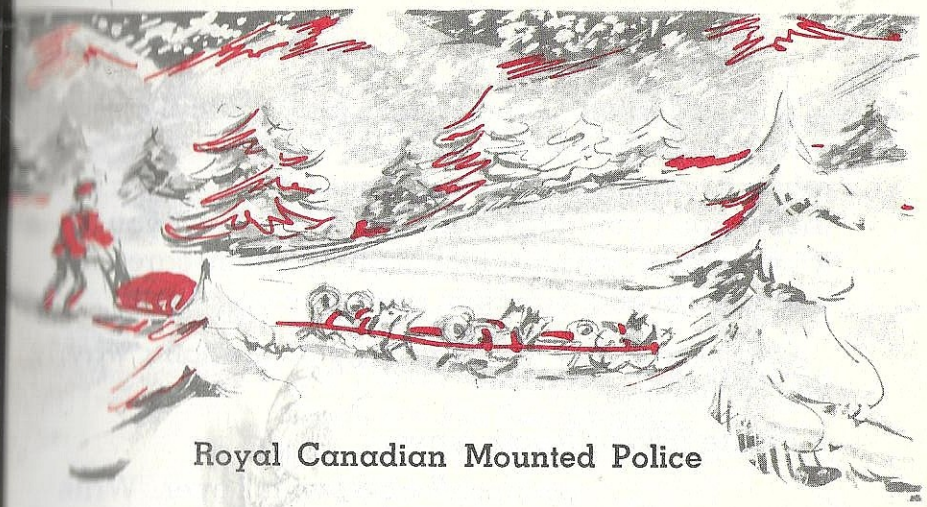
6. When you multiply dollars and cents by a whole number, where do you place the decimal point? Why?

7. When you add or subtract dollars and cents, where do you place the decimal point?

8. Which do you find easier to do, add, subtract, or multiply? Explain why.







Royal Canadian Mounted Police

Jim is proud to come from a country that has the lowest crime rate in the world. This country is Canada, our great good neighbor to the north. Jim's heroes are the Royal Canadian Mounted Police. They guard Canada's stormy coasts, watch over government property, and patrol Arctic northwestern Canada.

1. The Royal Canadian Mounted Police was organized in 1873. Tell how many years ago that was.

2. In 1873, there were 300 men on this police force. By 1950 the number was increased by 3200 more men. Without your pencil, tell how many men that makes altogether.

3. Here are some of the helpers of the Royal Canadian Mounted Police: 192 horses, 776 motor vehicles, 7 airplanes, 281 sleigh dogs, and 16 trained police dogs. How many helpers does that make in all?

Next Comes Division

With addition, subtraction, and multiplication recalled to make sure you know them, here we are ready to review division. Because division is a bit tricky, don't you think a few pages of "how you do it" would be worth while? Study them carefully and be sure about division from here on.

One can divide the short way or the long way, you remember.

Divide 7865 by 5 both ways.

Long Way	Short Way	
1573	1573	
5)7865	5)7865	
5		7÷5=1 with 2 over. Write 1 over the 7.
28		The left-over 2 before 8=28.
25		28÷5=5 with 3 over. Write 5 over the 8.
36		The left-over 3 before 6=36.
35		36÷5=7 with 1 over. Write 7 over the 6.
15		The left-over 1 before 5=15.
15		15÷5=3. Write 3 over the 5.

Using the long way, you **divide, multiply, subtract,** and **bring down** until all the figures in the dividend are used. Using the short way, you **think** your work and write only the quotient figures.

It is for you to decide which way to work any division example with a one-figure divisor.

Catching Up on Division

Now let's suppose you need to divide by a two-figure divisor.

First let's divide 82 by 41.

2	÷ To find your quotient figure, think how
41)82	many 4's there are in 8, the first
82	dividend figure. 8÷4=2
	Write 2 over the 2, **the last dividend figure used in this division.**
	× 2×41=82. Write the 82 under the 82.
	− There is no remainder.

Divide.

	a	b	c	d	e
1.	31)62	12)36	32)96	13)39	12)48

Next, let's divide 189 by 21.

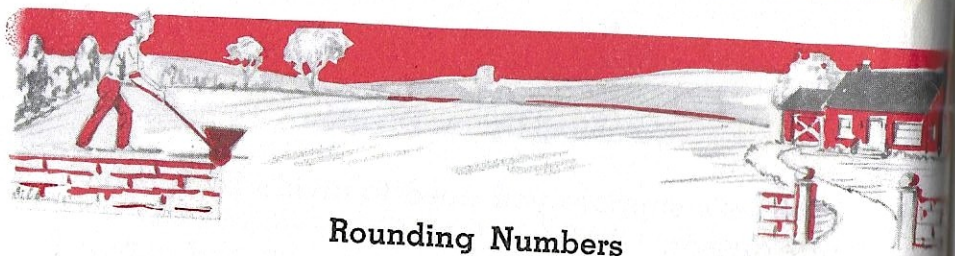
9	There are no 2's in 1, so use the first
21)189	two dividend figures to find your
189	quotient figure.
	÷ 18÷2=9. Write 9 over the 9 in the dividend.
	× 9×21=189
	− There is no remainder.

Divide.

2.	71)497	54)108	82)164	64)128	91)273

Remember: The **first** figure of a divisor used to find the first quotient figure is called a **trial divisor.**

More practice on page 355.



Rounding Numbers

Sometimes we do not need exact answers to our problems. An answer **just about right** will do. Look at this problem:

Mr. Foster has to use so much grass seed for each 100 square feet of lawn. He measured his lawn to see how many 100 square feet he has. The lawn measured 25 feet wide and 37 feet long. How many hundred square feet were there in the lawn?

Multiply 37 by 25. The answer is 925.

The area of the lawn is 925 square feet.

But Mr. Foster needs to know the area only to the **nearest 100** square feet. 925 is nearer 900 than 1000. So, the lawn is **about** 900 square feet.

$$\begin{array}{r} 37 \\ 25 \\ \hline 185 \\ 74 \\ \hline 925 \end{array}$$

When we put a number in its nearest hundred or thousand or million, we say we **round** that number. We call such numbers **round numbers.**

Round these numbers to the nearest hundred:

304 275 989 510 439 878

Round these numbers to the nearest thousand:

1985 3804 7130 4298 7487

Round these numbers to the nearest million:

3,149,000 8,971,421 6,648,748

More practice on page 356.

Measures and Measures

How well do you remember the tables of measures? Test yourself by writing each table and giving the answers to the questions. If any answers are wrong, study the tables of measures on page 382. Then try this test again. Good luck!

Length

1 foot = ? inches
1 yard = ? inches, ? feet
1 rod = ? feet, ? yards
1 mile = ? feet, ? rods

Time

1 minute = ? seconds
1 hour = ? minutes
1 day = ? hours
1 week = ? days
1 year = ? days, about ? weeks, ? months
1 leap year = ? days
1 century = ? years

Liquid

1 pint = ? cupfuls
1 quart = ? pints
1 gallon = ? pints, ? quarts

Dry

1 quart = ? pints
1 peck = ? quarts
1 bushel = ? quarts, ? pecks

Weight

1 pound = ? ounces
1 hundredweight = ? pounds
1 ton = ? pounds

Counting

1 dozen = ? things
1 gross = ? things, ? dozen

Write the abbreviations of the words used in these tables.

Start

Zero in the Quotient

Divide 4739 by 23.

```
    206 r 1
23)4739
   46
   139
   138
     1
```

We first divide 47 by 23.

÷ $4 \div 2 = 2$

Write 2 over the 7.

× $2 \times 23 = 46$

− $47 - 46 = 1$

↓ Bring down the 3, making a new dividend, 13. There are no 23's in 13. **Write 0 in the quotient** over the 3 and bring down the 9 to make a new dividend of 139.

÷ Divide 139 by 23.

$13 \div 2 = 6$. Write 6 over the 9 in the dividend.

× $6 \times 23 = 138$

− $139 - 138 = 1$. Write r 1 after the 6 in the quotient.

Divide. Look out for zeros. There is at least one in each answer.

	a	b	c	d
1.	53)5459	61)6649	33)66231	32)96175
2.	32)6720	42)6300	58)8149	75)9775

3. Mr. Spencer bought 8280 Christmas cards in boxes of 36 each. How many boxes of cards did he order?

4. A dealer sold 9672 blotters in packages of 24 each. How many packages did he sell?

Remember: The first quotient figure is written over the last dividend figure used in the first division.

More practice on page 356.

Dividing by 10, 100, and 1000

Do you know how to divide a number ending in zeros by a 10, 100, or 1000? Let's see.

Divide 19,000 by 100 by long division.

```
      190
100)19000
    100
     900
     900
       0
```

Your answer is 190, isn't it?

Now do you remember the word **cancel**? It means to cross off.

Let's divide 19,000 by 100 by canceling.

```
     190
1~~00~~)190~~00~~
```

There are two zeros in the divisor; so you cross off, or cancel, two zeros in both the dividend and divisor, and divide your 190 by 1.

Remember: When you divide a number ending in zeros by a divisor ending in zeros, you can cross off, or cancel, the same number of zeros at the end of both the dividend and divisor, and then divide.

Copy and divide by canceling.

	a	b	c	d
1.	30)180	400)1200	50)100	1000)5000
2.	40)1600	300)9000	600)18000	5000)1000000

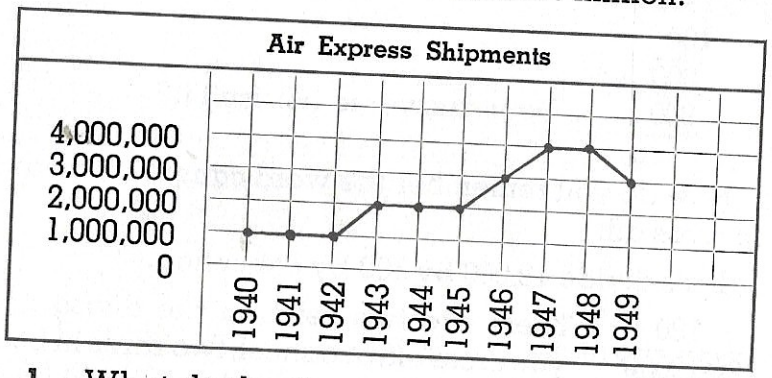
Make very sure you know about canceling. You can't imagine how much work it will save you all your life!

More practice on page 356.

Line Graph

Since it began, in 1927, Air Express has given us the swiftest express service the world has ever known.

Here is a line graph showing the number of shipments made by Air Express during the 1940's. The numbers are rounded to the nearest million.



1. What do the figures at the left show? What years are shown at the bottom of the line graph?

2. What is shown by each square from bottom to top?

3. How many shipments were made during each year shown in the line graph? Which year shows the greatest number of shipments? Which, the fewest? Name the years with the same number of shipments.

4. Make a line graph to show one of these:

Rail Express shipments during the 1940's
Ten highest world dams
Number of twins born in 1940 through 1948

Look in the **World Almanac** to find your figures.

Wise Saving

During the year, the Thompsons are cheerfully thrifty. Whatever they save in that way goes into their Vacation Fund.

1. Mrs. Thompson wanted a chair that cost $45.00. She waited for a sale and bought the same chair for $37.50. What did she save by waiting?

2. The cleaners charge 75¢ to clean a sweater. The Thompsons now wash their own sweaters for 3¢-worth of soap flakes for each sweater. What do they save by washing 4 sweaters instead of sending them to be cleaned?

3. The neighbors pay $1.50 each time their walks are shoveled in the winter. At that rate, what does Roy Thompson save his family when he shovels snow 15 times without being paid?

Finding Correct Quotient Figure

Let's divide 135 by 27.

Wrong

```
   6
27)135
  162
```

÷ First divide 13 by 2.
13 ÷ 2 = 6 r 1. Write 6 over the 5.
× 6 × 27 = 162!
− You can't take 162 from 135!
So 6 is too large.

Right

```
   5
27)135
  135
```

÷ 13 ÷ 2 = 6 r 1. Now you know that 6 is too large for your quotient figure. Try 5.
× 5 × 27 = 135

Remember: When a trial quotient figure is too large, try the next smaller number.

Divide 855 by 45.

```
   19
45)855
   45
  405
  405
```

÷ 8 ÷ 4 = 2
× 2 × 45 = 90
85 − 90 = ? No!
Try 1 as the quotient figure.
Write 1 over the first 5.
1 × 45 = 45
− 85 − 45 = 40
↓ Bring down the 5, making 405
÷ 40 ÷ 4 = 10. But you can never have a quotient figure larger than 9, so write 9 in the quotient.
× 9 × 45 = 405

Divide.

24)1358 63)1197 24)48216 27)10773

Help for Dividers

You can save yourself a good bit of work in dividing if you want to. When the second figure of the divisor is 1, 2, 3, 4, or 5, use the first figure as the trial divisor. When the second figure of the divisor is 6, 7, 8, or 9, add 1 to the first figure of your divisor and use it as the trial divisor. For example, you say 58 is nearer 60 than 50, so you will use 6, not 5, as your trial divisor.

Let's see how it works.

Divide 1896 by 58.

As 58 is nearer 60 than 50, use 6 as your trial divisor.

```
  32 r 40
58)1896
  174
  156
  116
   40
```

÷ 18 ÷ 6 = 3. Write 3 over the 9.
× 3 × 58 = 174
− 189 − 174 = 15
↓ Bring down the 6, making 156.
÷ 15 ÷ 6 = 2 r 3. Write 2 over the 6.
× 2 × 58 = 116
− 156 − 116 = 40 r

Divide.

	a	b	c	d
1.	38)2964	87)3915	59)3245	67)6360
2.	19)3762	37)3626	79)7742	86)5504
3.	29)8555	58)7078	77)61078	46)53462

More practice on page 357.

Changing Measures

When you change a larger measure to a smaller measure, you multiply. Why?

When you change a smaller measure to a larger measure, you divide. Why?

Change.

	a	b	c
1.	4 yd. to in.	4 lb. to oz.	3 hr. to min.
2.	2 T. to lb.	36 in. to ft.	13 yd. to ft.
3.	5 gal. to qt.	24 qt. to pk.	16 pk. to bu.
4.	3 bu. to qt.	35 da. to wk.	36 qt. to gal.
5.	2 da. to hr.	18 pt. to qt.	24 doz. to gro.

Read each problem to decide whether to multiply or divide. Then work the problems.

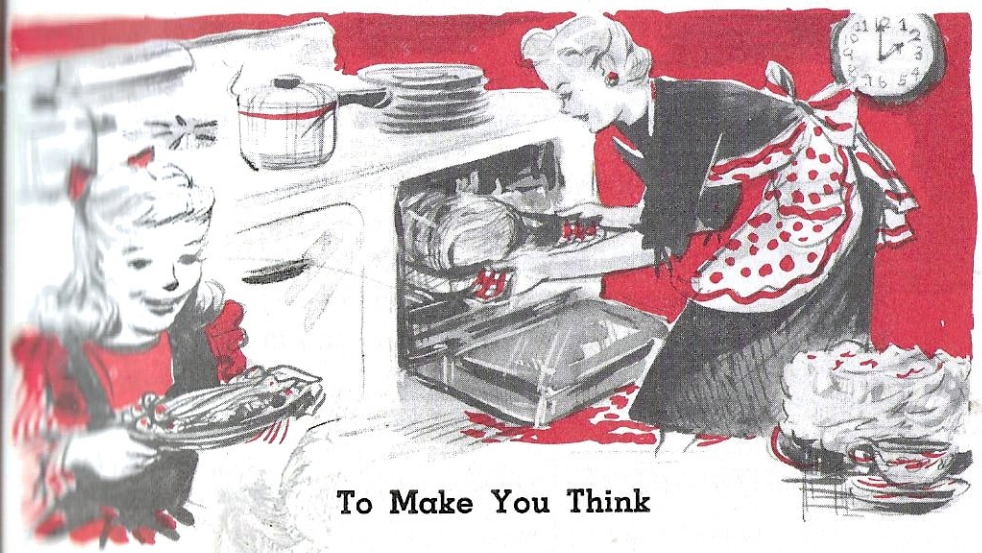
6. Mother made 8 gallons of tomato juice. She poured it into quart jars. How many jars did she use?

7. Bob said he is 132 months old. How many years old is he?

8. Our school principal ordered 4 gross of pencils. How many pencils was that? How many dozen pencils was that?

9. On Mr. Stewart's candy counter were neatly piled 25 one-pound boxes of candy. How many ounces of candy was that in all?

More practice on page 358.



To Make You Think

1. Lucy's mother plans to have dinner at 2 o'clock Sunday. It will take $2\frac{1}{2}$ hr. for the roast to cook. When should Lucy's mother put the roast into the oven in order to have it ready for 2 o'clock?

2. Bill read Chapters XXXVII through XLI in a book. How many chapters did he read?

3. Mr. Martin sent Dick to the bank to exchange a 10-dollar bill for quarters, and a 5-dollar bill for dimes. How many quarters and how many dimes did Dick get?

4. Mrs. Jones had \$473.28 in the bank. She drew out $\frac{1}{8}$ of this amount. How much was left in the bank?

5. Mr. Lee's used truck cost \$1235. He paid \$650 down and then paid the rest in 15 equal payments. How much was each payment?

6. A farmer had 1290 lettuce plants to set out in rows of 28. How many full rows did he make? How many plants were left over for another row?

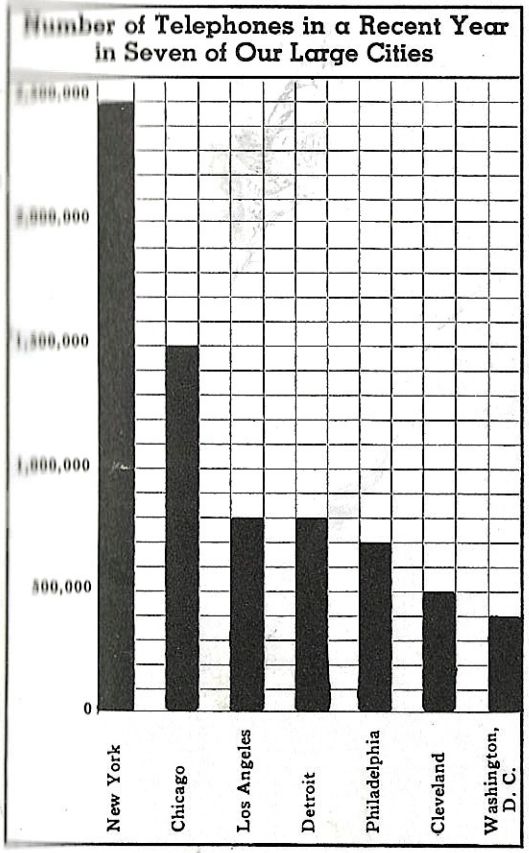
How Well Can You Divide?

Copy and work the examples in Row 1. Check your work carefully. Right answers for all these examples can excuse you from the rest of the page. If you miss an example, work all those in the column under it. Use short division where you can. All 90 division facts are on this page.

	a	b	c	d	e
1.	$9\overline{)873}$	$8\overline{)6762}$	$32\overline{)96}$	$52\overline{)104}$	$26\overline{)4186}$
2.	$6\overline{)408}$	$5\overline{)5030}$	$42\overline{)84}$	$61\overline{)183}$	$18\overline{)3980}$
3.	$7\overline{)665}$	$9\overline{)7659}$	$24\overline{)48}$	$83\overline{)166}$	$36\overline{)1268}$
4.	$8\overline{)600}$	$7\overline{)3479}$	$33\overline{)66}$	$92\overline{)276}$	$99\overline{)1876}$
5.	$5\overline{)375}$	$6\overline{)1500}$	$43\overline{)86}$	$31\overline{)217}$	$78\overline{)5616}$
6.	$4\overline{)156}$	$8\overline{)1888}$	$21\overline{)84}$	$60\overline{)180}$	$85\overline{)7225}$
7.	$6\overline{)582}$	$9\overline{)4140}$	$32\overline{)262}$	$41\overline{)246}$	$36\overline{)28908}$
8.	$7\overline{)532}$	$5\overline{)2410}$	$22\overline{)66}$	$30\overline{)150}$	$66\overline{)2472}$
9.	$4\overline{)2960}$	$2\overline{)1172}$	$12\overline{)48}$	$10\overline{)900}$	$15\overline{)67515}$
10.	$5\overline{)195}$	$8\overline{)8056}$	$20\overline{)180}$	$43\overline{)344}$	$13\overline{)5993}$
11.	$4\overline{)4200}$	$6\overline{)6096}$	$30\overline{)300}$	$77\overline{)2156}$	$13\overline{)8476}$
12.	$7\overline{)707}$	$2\overline{)6018}$	$40\overline{)1600}$	$82\overline{)7216}$	$11\overline{)6479}$

Bar Graph

Here is a **bar graph** comparing the number of telephones in some of our large cities in a recent year. The numbers are rounded to the nearest one hundred thousand.



1. For how many telephones does each square from bottom to top stand?

2. How many telephones are in each of the cities shown on the graph?

3. Which city has the greatest number of telephones?

4. How many squares high would you make a bar to show 50,000 telephones; 100,000 telephones; 2,300,000 telephones?

5. Make a bar graph showing the seven states leading in the number of cars. Round off the numbers to the nearest one hundred thousand. The **World Almanac** can help you here, too.

Nancy's Bad Dream

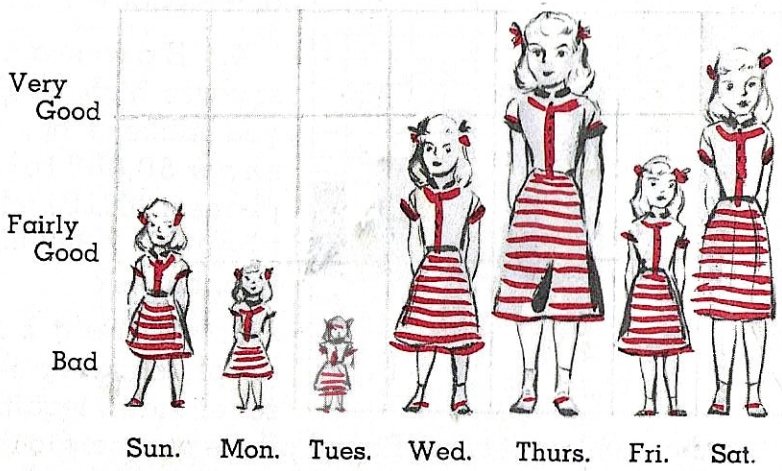
Monday Nancy's class learned about bar graphs. That night Nancy had a dream. Such a dream! She dreamed that for a week she was the bar on a bar graph that showed how well she behaved.

When she was bad she was a very, very short bar.

When she was fairly good and did what she should do but not very cheerfully, she was a longer bar.

When she was very good and did all she could to make home a happy place, she was a long bar.

Read Nancy's chart and decide whether or not she should be proud of it.



How about making a behavior graph for yourself?

Using a Three-Figure Divisor

The Dixon Television Company sold 235 television sets for $95,175. What was the average price of each set?

To find the average price, divide $95,175 by 235.

		The second figure of the divisor is 3; so use the first figure as
	÷	the trial divisor. $9 \div 2 = 4$
		Write 4 over the 1.
$ 405	×	$4 \times 235 = 940$
235)$95175	−	$951 - 940 = 11$
940	↓	Bring down 7, making 117.
1175		117 cannot be divided by 235; so
1175		write 0 over the 7, and bring down the 5, making 1175.
	÷	$11 \div 2 = 5$. Write 5 over the 5.
	×	$5 \times 235 = 1175$
	−	$1175 - 1175 = 0$
		The average price was $405.

Divide.

1.	321)33705	921)98547	302)91204	620)49620
2.	452)19478	321)20544	613)57622	315)14552
3.	512)38400	432)35916	625)35000	841)47096
4.	633)41169	528)49685	531)39855	716)45108
5.	912)7296	918)45975	705)37365	940)53590

6. A school bought 1728 rulers. They came in boxes of 144. How many boxes of rulers were there?

More practice on page 359.

Using a Three-Figure Divisor

Divide 44,719 by 561.

```
      79 r 400
561)44719
    3927        ÷   44 ÷ 6 = 7. Write 7 over the 1.
    5449        ×   7 × 561 = 3927
    5049        −   4471 − 3927 = 544
     400 r      ↓   Bring down 9, making 5449.
                ÷   54 ÷ 6 = 9. Write 9 over the 9.
                ×   9 × 561 = 5049
                −   5449 − 5049 = 400 r
```

The second divisor figure is 6, so think "56 is nearer 60 than 50," and use 6 as the trial divisor.

Divide.

1.	291)24864	385)22109	679)63132	794)22324
2.	267)15750	577)15776	963)65790	662)19671
3.	198)19225	876)34461	481)12706	189)15031
4.	397)17880	792)28612	298)9000	691)54070
5.	862)73470	579)36000	887)86139	276)25684
6.	199)14007	489)36231	573)39264	388)26080

7. In one recent year there were 28,309 deaths from automobile accidents in this country. Find the average whole number of deaths per day.

8. One month, an airplane flew 15,768 mi. at an average speed of 219 mi. per hour. Find its flying time.

More practice on page 359.

Using a Three-Figure Divisor

The plan for using a larger trial divisor does not always work.

Divide 83,704 by 275.

```
      2
275)83704
   550      ÷   8 ÷ 3 = 2 r 2
   287      ×   2 × 275 = 550
            −   837 − 550 = 287, and 287 is
                larger than 275!
```

The second divisor figure is 7, and 27 is nearer 30 than 20; so you would use 3 as the trial divisor.

Try again and this time use 3 as the trial quotient.

```
                Write 3 over the 7.
            ×   3 × 275 = 825
   304 r 104    837 − 825 = 12
275)83704   ↓   Bring down 0, making 120.
   825          There are no 275's in 120.
    1204        Write 0 over the 0.
    1100    ↓   Bring down 4, making 1204.
     104 r  ÷   12 ÷ 3 = 4
            ×   4 × 275 = 1100
            −   1204 − 1100 = 104 r.
```

Divide.

1.	567)52890	948)25286	295)28925	783)57942
2.	865)75255	436)33244	679)50973	871)60099
3.	692)38060	815)76592	451)25827	276)27204

More practice on page 359.

No Pencils!

Write the answers only.

1. How far can a car go in 11 hours at an average speed of 40 miles an hour?

2. Boy Scouts hiked 12 miles in 3 hours. What was their average for one hour?

3. Leo has saved $3.86 to buy a fish rod costing $7.50. How much more must Leo save?

4. Mr. Olds saved $12 a month to buy a radio set that cost $240. How long did he have to save?

5. Ann Martin is 11 years old. Her father is 40 years old. How old was Ann's father when she was born?

6. Robert Forrest was 12 years old this January. In what year was he born?

7. Ben's big brother bought an old radio for $35. After fixing it up, he sold it for $58.99. How much money did he gain from this sale?

8. In Mr. Cate's orchard there are 24 rows of apple trees, with 30 trees in each row. How many apple trees is that?

9. One third of a yard is how many inches?

10. Mr. Dawson saved $720 last year which he divided among the 12 clubs at the Young People's Center. How much did each club receive?

Taking Three Steps

You know well how to work two-step problems. Let's see if you can take three steps in your work.

1. Ann bought 6 aprons at 69¢ each and 2 pairs of gloves at $1.79 a pair. How much did she spend?

2. Dick saved $8.78. He bought a bathing suit for $2.25, sneakers for $2.65, and 2 towels at 62¢ each. How much did he have left?

3. To make rag dolls, Kitty bought 3 yd. of muslin at 39¢ a yard and 4 packages of cotton at 10¢ each. How much did she spend?

4. Barbara bought $\frac{1}{2}$ lb. of butter at 76¢ a pound, and $\frac{1}{4}$ lb. of cream cheese at 60¢ a pound. How much did she spend?

More practice on page 360.

Things to Know

This page will remind you of facts that will help you now in dividing and later in working with fractions.

2 will evenly divide any number that ends in 0, 2, 4, 6, or 8.

5 will evenly divide any number that ends in 5 or 0.

10 will evenly divide any number that ends in 0.

3 will evenly divide any number if the sum of its figures can be evenly divided by 3.

In the number 624, the sum of the figures is $6+2+4=12$. $12\div3=4$. $624\div3=208$.

1. Which of these numbers will 3 divide evenly?

942 126 219 828 217

6 will evenly divide any even number that 3 will divide evenly.

2. Which of these numbers will 6 divide evenly?

942 126 219 828 217

4 will evenly divide a number if the last two figures of the number can be evenly divided by 4.

In the number 236, 36 can be evenly divided by 4, so 236 can be evenly divided by 4. $236\div4=59$.

3. Which of these numbers can be evenly divided by 4?

728 516 421 624 345

Checking or Proving Your Work

You know now that you can add, subtract, multiply, or divide. That's fine, but are you always sure your work is right? You can be sure, of course, by checking your work to prove your answers.

Add down and check by adding up.

	a	b	c	d	e
1.	7	5	16	57	76
	5	8	86	74	27
	9	6	88	68	23
	8	8	49	89	36
	7	9	35	95	23
	6	5	67	59	79

Subtract and check by adding the difference to the subtrahend.

2.	8514	9141	6358	6543	6790
	3833	8984	3977	145	4002

Multiply and check by multiplying the multiplier by the multiplicand.

3.	3982	6871	2895	3967	4960
	19	56	76	298	397

Divide and check by multiplying the quotient by the divisor.

Use short division.

4. $4\overline{)2156}$ $7\overline{)6111}$ $6\overline{)1806}$ $5\overline{)3780}$ $4\overline{)9668}$

Use long division.

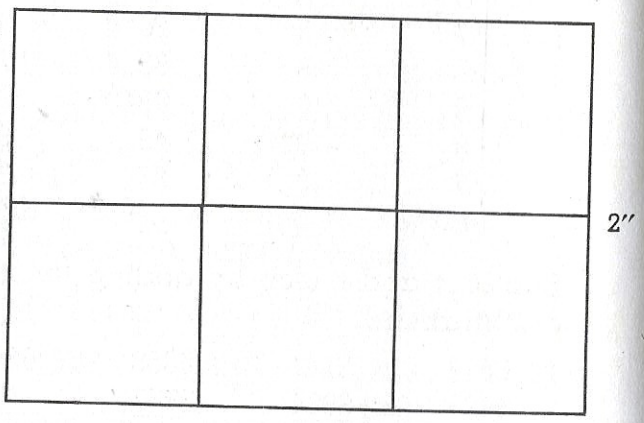
5. $31\overline{)8959}$ $43\overline{)3741}$ $63\overline{)3276}$ $75\overline{)2400}$

Finding the Area

While we are recalling what you have learned about multiplication, how about areas?

Do you remember how you found the area of a rectangle 3 inches long and 2 inches wide?

You drew a figure like this:



Then you counted the squares in it and found there were 6 squares.

As the squares were each 1 inch long and 1 inch wide, you called them **square inches** (sq. in.).

Then you learned that if you multiplied the number of inches long by the number of inches wide, your answer was still 6 square inches.

Remember: To find the area of a surface, multiply the length by the width and write your answer as a square measure.

$$10 \text{ in.} \times 12 \text{ in.} = 120 \text{ sq. in.}$$

Maybe it would be easier for you to remember just this: Length × Width = Area.

Perimeter and Area

Mr. Lee measured the sides of his yard for a fence. They measured 19 ft., 28 ft., 19 ft., and 28 ft. The yard was a rectangle.

To find the **perimeter,** or distance around the yard, his son added the four measurements.

Mr. Lee's way was simpler:

2 × Length + 2 × Width = Perimeter.

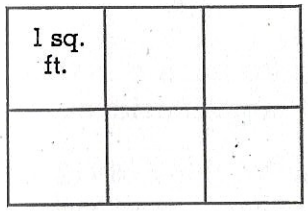
2 × 28 ft. + 2 × 19 ft. = 94 ft.

Then, Mr. Lee found the **area,** or surface measurement of his yard, so that he would know how much grass seed to buy.

Length × Width = Area 28 ft. × 19 ft. = 532 sq. ft.

1. Find the perimeter of rectangle A; the area.
2. Find the perimeters of rectangles B; C; D.
3. Find the areas of rectangles B; C; D.
4. Find the perimeter of a playground 55 ft. long and 51 ft. wide.
5. Find the area of a house lot 125 ft. by 74 ft.

A



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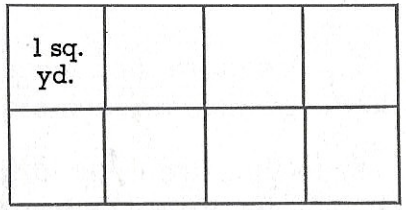
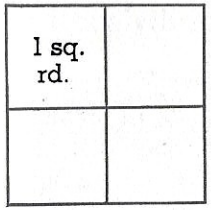
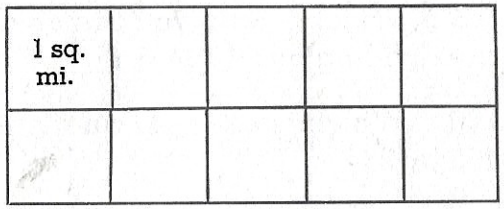


C



D



Choose the Correct Answer

Choose the part in parentheses that is correct for each sentence.

1. The ancient Romans used the letter (D; L; C) to mean 100.

2. To find the area of a rectangle (multiply the length by the width; divide the length by the width).

3. To find the perimeter of a rectangle (multiply the length by the width; find the distance around it; find the length of two of its sides).

4. There are (366 days; 355 days; 365 days) in a year.

5. A hundredweight is the same as (100 lb.; 100 T.; 100 ounces).

6. There are (1760 rods; 5280 rods; 320 rods) in a mile.

7. A square inch measures (an inch on each of the four sides; an inch on two opposite sides).

8. When we think of gross we think of (12 half dozen; one half of 12 dozen; 12 dozen).

9. Which would you use as a trial divisor if you are dividing by 58? (4, 5, 6)

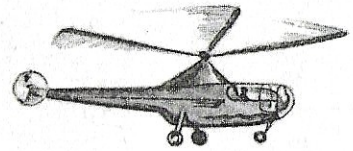
10. Which is the right quotient figure in dividing 135 by 26? (5, 6)

Show How Well You Can Divide

Divide.

	a	b	c	d	e
1.	3)4729	2)6940	4)7296	5)7290	6)58974
2.	7)51646	8)32192	9)46683	6)31254	7)86961
3.	2)87934	5)79620	3)81075	4)91976	8)48024
4.	7)41286	9)89064	6)56796	8)76096	9)77409

	a	b	c	d
5.	23)83122	42)49812	34)87210	61)13298
6.	41)78064	62)14942	73)23652	43)87204
7.	32)21088	22)79398	81)97848	91)710164
8.	52)509912	24)81696	62)92066	72)81072
9.	13)73151	14)63098	21)79695	83)408204
10.	27)33318	36)224676	45)22590	66)15444
11.	38)17024	47)30597	59)50976	86)26832
12.	39)266994	57)420945	98)95550	89)66127
13.	321)213144	432)316224	341)324291	203)138446
14.	122)95282	344)193672	513)225207	412)354732
15.	216)134136	317)138846	428)186608	499)160179
16.	317)265012	488)316712	579)224073	508)353568



Juan of Mexico

Juan earns money by being a guide for American tourists. He knows many facts about his beautiful land of Mexico.

The tourists like his smile and the **charra** suit Juan wears. The **charra** is a copy of the costume worn by the old-time Spanish ranchmen in Mexico. Mexican children like to wear it just as American boys like to wear Roy Rogers or Hop-Along-Cassidy suits.

Read the facts Juan tells the tourists. Then write as figures all the numbers mentioned.

1. Mexico covers seven hundred sixty-seven thousand, one hundred ninety-eight square miles.

2. The population of Mexico is twenty-five million, five hundred sixty-four thousand, two hundred eighteen.

3. About one hundred sixty thousand foreigners live in Mexico.

4. Some of Mexico's mountains are ten thousand feet high.

Helpful Fractions

What would we do without fractions?

There are 6 people to serve with a pudding. What part of the pudding should each have? Here fractions will help.

Two boys want to go to a game. They have one ticket. Will fractions help here? Can the ticket be divided?

Your money is not enough to buy a whole pound of candy. What part of a pound can you buy? Use fractions.

Your money is not enough to buy a sweater. Can you buy part of a sweater?

I live between your house and school. Do I live half way between the two? Fractions again!

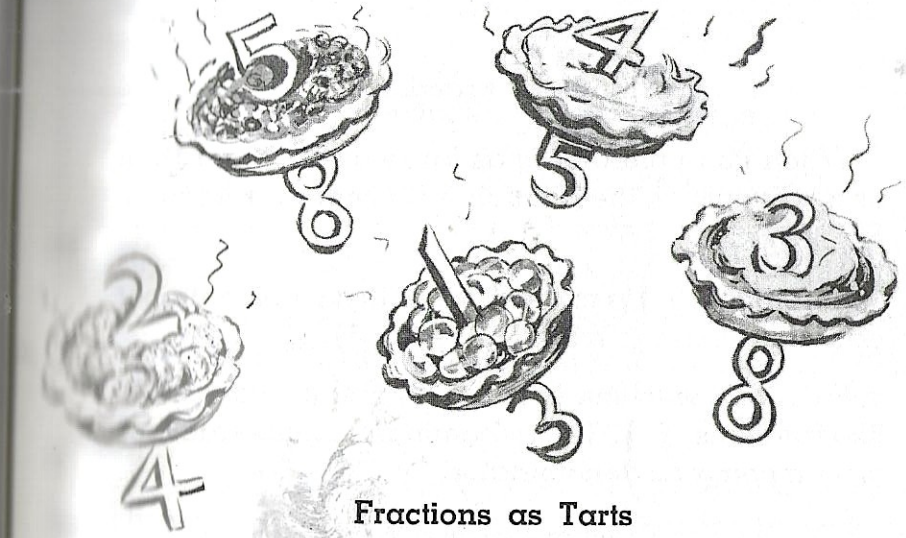
Can you spend $\frac{1}{2}$ of your money?

Can you eat $\frac{1}{8}$ of a cake?

Can you buy $\frac{1}{10}$ of an automobile?

Do you see in how many ways you can use fractions, and that sometimes you can't use them?

See if you can explain why you can find a fraction of a mile but cannot find a fraction of a person.



Fractions as Tarts

Have you ever heard the saying, "The time to take tarts is when they are passing"? The poor boy at the right didn't think of that and now he is sad indeed!

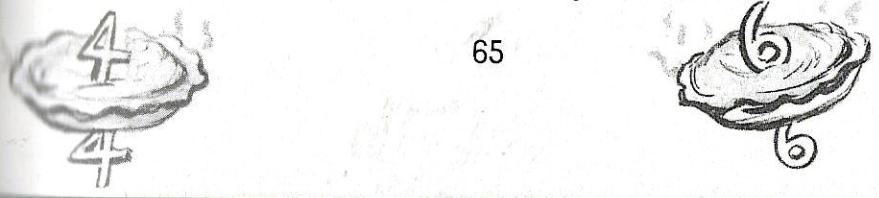
It is the same with fractions. For two years and more now you have been offered a chance to learn about fractions, something you will need to use all your life. If you have let them get past you before, don't do so again and then feel like that boy at the right.

Here we go once more.

The number below the line in a fraction is the **denominator.** It tells into how many parts a whole has been divided.

The number above the line is the **numerator.** It shows how many parts have been taken.

A fraction with the same number above and below the line equals a whole. $\frac{9}{9} = 1$.



Kinds of Fractions

When its numerator is as large as or larger than its denominator, the fraction is an **improper** fraction. $\frac{19}{9}, \frac{12}{5}, \frac{4}{3}, \frac{6}{6}$.

A number that is made up of both a whole number and a fraction is a **mixed number.** $3\frac{1}{2}, 9\frac{5}{6}$.

Fractions with the same denominator are called **like** fractions. $\frac{3}{4}, \frac{1}{4}$. The denominator of like fractions is their **common denominator.**

Fractions Gone Wild

Come to the rescue! Write these headings in a row on your paper: Proper Fractions, Improper Fractions, Mixed Numbers. Then capture the fractions, one by one, and place them under the headings that fit them.

$\frac{1}{4}$ $4\frac{1}{5}$ $\frac{15}{3}$ $\frac{5}{8}$ $\frac{1}{8}$ $\frac{7}{3}$ $\frac{4}{7}$ $3\frac{1}{3}$ $\frac{9}{16}$ $\frac{9}{8}$ $5\frac{7}{10}$ $\frac{2}{3}$ $\frac{6}{3}$ $2\frac{1}{2}$ $\frac{3}{11}$ $4\frac{1}{2}$ $\frac{5}{6}$ $\frac{6}{10}$ $\frac{15}{8}$

Using Fractions to Show Division

Sam's mother had 5 cupcakes. She wanted to divide them equally among 6 boys. What part of a cupcake should each boy get? $5 \div 6 = ?$

If 1 cupcake is divided among 6 boys, each boy will get 1 sixth, or $\frac{1}{6}$ of a cupcake. If 5 cupcakes are divided among 6 boys, each boy will get 5 sixths, or $\frac{5}{6}$ of a cupcake. $5 \div 6 = \frac{5}{6}$

You see that instead of writing $5 \div 6$, you may show the division as a fraction: $\frac{5}{6}$. The line between the 5 and the 6 means **divided by.**

You now know three ways to show division:

$5 \div 6$ $6\overline{)5}$ $\frac{5}{6}$

$6 \div 6$ may be written $\frac{6}{6}$. $12 \div 6$ may be written $\frac{12}{6}$.

$1 \div 6 = \frac{1}{6}$ $1 \div 2 = \frac{1}{2}$ $1 \div 8 = \frac{1}{8}$

Write as fractions:

	a	b	c	d
1.	$7 \div 9$	$17 \div 5$	$7 \div 7$	$4 \div 10$
2.	$6 \div 8$	$7 \div 3$	$9 \div 1$	$12 \div 1$
3.	$8 \div 3$	$10 \div 12$	$11 \div 4$	$13 \div 2$

4. Three quarts of peanuts were divided equally among 8 boys. What part of a quart of peanuts did each boy get?

5. Harry divided 4 cans of food equally among his 5 dogs. What part of a can of food did each dog get?

Whole Numbers, Improper Fractions, and Mixed Numbers

Now let's see about whole numbers, improper fractions, and mixed numbers. You know that a fraction is an improper fraction when its numerator is as large as or larger than its denominator.

Let's change a whole number to an improper fraction. Change the whole number 8 to thirds.

$8 = \frac{?}{3}$ Think, there are 3 thirds in 1, so there must be 8 times 3 thirds in 8.

$8 = \frac{24}{3}$ 8×3 thirds $= 24$ thirds or $\frac{24}{3}$

Change each of these numbers to fourths:

2 3 4 5 6

The fraction $\frac{10}{5}$ shows that more than 1 thing has been divided into fifths, and that 10 fifths have been taken. If you divide the numerator of $\frac{10}{5}$ by the denominator, see what you will get.

$\frac{10}{5} = 10 \div 5 = 2$; so $\frac{10}{5}$ of a candy bar $= 2$ whole candy bars.

What does $\frac{7}{4}$ mean?

Divide 7 by 4. $7 \div 4 = 1 \text{ r } 3$

$4\overline{)7}$ $\quad 1 \text{ r } 3$ Write the remainder, 3, over the divisor, 4, and you have $\frac{3}{4}$.

$\frac{7}{4} = 1\frac{3}{4}$ (1 whole and $\frac{3}{4}$ of another whole)

You have changed an improper fraction to a mixed number, haven't you?

More practice on page 360.

Remember: To change an improper fraction to a whole or mixed number, divide the numerator by the denominator and write any remainder as a fraction.

Change these improper fractions to whole or mixed numbers:

1. $\frac{8}{5}$ $\frac{9}{9}$ $\frac{7}{2}$ $\frac{10}{2}$ $\frac{9}{3}$ $\frac{7}{7}$ $\frac{13}{3}$

Changing a Mixed Number to an Improper Fraction

Change the mixed number $4\frac{2}{3}$ to thirds.

$4\frac{2}{3} = \frac{?}{3}$ Think, there are 3 thirds in 1, so there must be 4 times 3 thirds in 4.

$4 = 12$ thirds or $\frac{12}{3}$.

$4\frac{2}{3} = \frac{14}{3}$ $4\frac{2}{3} = 14$ thirds or $\frac{14}{3}$.

Change these mixed numbers to improper fractions:

2. $5\frac{1}{3}$ $4\frac{2}{5}$ $3\frac{1}{6}$ $2\frac{1}{8}$ $6\frac{3}{4}$

Remember: To change a mixed number to an improper fraction, multiply the whole number by the denominator of the fraction, add the numerator, and write the sum over the denominator.

3. Change each of these improper fractions to a whole or a mixed number:

$\frac{17}{2}$ $\frac{72}{8}$ $\frac{33}{4}$ $\frac{27}{8}$ $\frac{9}{2}$ $\frac{15}{4}$

4. Change $3\frac{5}{7}$ to sevenths; $5\frac{7}{8}$ to eighths; $4\frac{8}{9}$ to ninths; $7\frac{3}{4}$ to fourths; $9\frac{7}{10}$ to tenths; $10\frac{4}{5}$ to fifths.

Missing Facts

Supply the missing fact in each of these problems. Then, work the problem.

1. For his Halloween party, Alec Gates bought favors for $2.00, a witch's broom for $.59, some masks for $1.25, and taffy apples for $.96. Had he enough money left to buy some peanut brittle costing $.20?

2. Alec put jack-o-lanterns on the entire front fence. He spaced them a foot apart. How many jack-o-lanterns did he use on the fence?

3. Alec's big sister arranged to have 2 glassfuls of sweet cider for each guest. How much cider was that in all?

4. Mrs. Gates made 4 dozen doughnuts for the guests. Were there enough for each guest to have 4 doughnuts?

5. The gypsy fortune-tellers told 12 fortunes that evening. If each told an equal number of fortunes, how many did each tell?

6. Only half of the boys bobbed successfully for apples. How many boys was that in all?

7. Twelve guests divided themselves into groups for playing games. How many games were going on at once?

8. The prize-winning costume was made of 5 yd. of net. What did it cost a yard?

9. The party lasted from 7 P.M. until quite late. How many hours was that?

Working with Like Fractions

You can add and subtract like fractions. Like fractions have the same denominator. That is like saying they have the same name, are the same kind of thing, and so can be added together.

To add like fractions, add the numerators and write their sum over the common denominator.

$\frac{2}{6}+\frac{1}{6}+\frac{2}{6}=\frac{5}{6}$. You can add sixths, just as you add other things with the same name.

Add.

1. $\frac{3}{7}+\frac{2}{7}+\frac{1}{7}$ $\frac{1}{5}+\frac{2}{5}+\frac{1}{5}$ $\frac{1}{9}+\frac{4}{9}+\frac{2}{9}$
2. $\frac{5}{8}+\frac{1}{8}+\frac{1}{8}$ $\frac{3}{10}+\frac{4}{10}+\frac{2}{10}$ $\frac{3}{9}+\frac{2}{9}+\frac{3}{9}$

To subtract like fractions, subtract the smaller numerator from the larger one, and write the difference over the common denominator.

Subtract.

3. $\frac{7}{7}-\frac{2}{7}$ $\frac{7}{11}-\frac{5}{11}$ $\frac{9}{12}-\frac{6}{12}$ $\frac{8}{15}-\frac{7}{15}$
4. $\frac{3}{10}-\frac{1}{10}$ $\frac{9}{12}-\frac{5}{12}$ $\frac{9}{20}-\frac{6}{20}$ $\frac{17}{18}-\frac{6}{18}$

5. In making fruit cake, Mary used $\frac{7}{16}$ lb. of nuts, $\frac{5}{16}$ lb. of raisins, and $\frac{3}{16}$ lb. of candied fruit. How much did the nuts, raisins, and fruit weigh?

6. Polly used $\frac{7}{8}$ lb. of powdered sugar for frosting and $\frac{1}{8}$ lb. for doughnuts. How much more sugar did she use for the frosting than for the doughnuts?

More practice on page 361.

Adding Mixed Numbers with Like Fractions

Let's say you collected $2\frac{1}{4}$ doz. eggs yesterday and $1\frac{2}{4}$ doz. today. How many dozen eggs did you get in the 2 days? Of course, to find out you must add.

Add $2\frac{1}{4}+1\frac{2}{4}$.

$2\frac{1}{4}$
$1\frac{2}{4}$
$3\frac{3}{4}$

First add the fractions. $\frac{1}{4}+\frac{2}{4}=\frac{3}{4}$
Write $\frac{3}{4}$ under the fractions.
Then add the whole numbers. $2+1=3$
Write 3 under the whole numbers.
You found $3\frac{3}{4}$ doz. eggs in the 2 days.

Now try adding $4\frac{1}{3}$ to $6\frac{2}{3}$.

$4\frac{1}{3}$
$6\frac{2}{3}$
11

Do you see that the sum of the fractions makes $\frac{3}{3}$ or 1 whole which must be added to the sum of the whole numbers?
$1+4+6=11$.

Next add $7\frac{5}{6}$ and $8\frac{2}{6}$.

$7\frac{5}{6}$
$8\frac{2}{6}$
$16\frac{1}{6}$

$\frac{5}{6}+\frac{2}{6}=\frac{7}{6}$.
$\frac{7}{6}=1\frac{1}{6}$.
Write the $\frac{1}{6}$ under the fractions and add the 1 whole to the whole numbers.

Now be very sure. If you do not understand all of the work on this page, if you cannot add mixed numbers with like fractions, speak right up and stick to it till you do understand perfectly. Learning each fraction idea as you come to it is laying a firm foundation for understanding other fraction ideas.

Tom's Old Toys

Tom kept many of the toys he used to play with. He liked to have them and he didn't want his young brothers to play with them.

Then came the year he went into the sixth grade and began to feel too old for toys. He thought about those toys and decided he had been rather selfish.

One day he told Jim and George, his younger brothers, that they could have the toys if each would take just half.

"Oh, good! We'll divide them and each take exactly half," said the boys as they rushed into Tom's room.

The first thing they saw was Tom's old sled. What to do about that! Could each boy have half?

Look at the pictures of Tom's things and tell which of them George and Jim could divide into halves.

How could they divide the books? Could each take half of the electric train tracks and the cars? Would either one have as much fun with $\frac{1}{2}$ of the train set as they could have together with it all?

Would it be wise to divide the erector set into halves? Why?

What do you think Tom should have said to his two brothers?

Let's Work Awhile

Change these whole numbers to improper fractions:

1. 8 to fourths 9 to thirds 6 to fifths

Change these improper fractions to whole or mixed numbers:

	a	b	c	d	e
2.	$\frac{9}{5}$	$\frac{8}{3}$	$\frac{6}{5}$	$\frac{10}{4}$	$\frac{9}{3}$

Change these mixed numbers to improper fractions:

3. $4\frac{1}{3}$ $5\frac{2}{5}$ $6\frac{1}{8}$ $9\frac{1}{2}$ $7\frac{1}{4}$

Add these like fractions:

4.

$\frac{1}{6}$	$\frac{2}{8}$	$\frac{1}{9}$	$\frac{1}{10}$	$\frac{1}{7}$
$\frac{2}{6}$	$\frac{1}{8}$	$\frac{5}{9}$	$\frac{4}{10}$	$\frac{2}{7}$
$\frac{2}{6}$	$\frac{4}{8}$	$\frac{2}{9}$	$\frac{2}{10}$	$\frac{2}{7}$

Subtract these like fractions:

5.

$\frac{4}{5}$	$\frac{7}{9}$	$\frac{9}{10}$	$\frac{7}{12}$	$\frac{11}{12}$
$\frac{3}{5}$	$\frac{5}{9}$	$\frac{6}{10}$	$\frac{6}{12}$	$\frac{7}{12}$

Add these mixed numbers:

6.

$3\frac{1}{5}$	$6\frac{1}{4}$	$5\frac{1}{6}$	$3\frac{4}{7}$	$8\frac{1}{3}$
$2\frac{3}{5}$	$7\frac{2}{4}$	$4\frac{5}{6}$	$2\frac{3}{7}$	$9\frac{2}{3}$

7.

$8\frac{3}{4}$	$9\frac{1}{3}$	$8\frac{4}{5}$	$7\frac{5}{6}$	$6\frac{3}{8}$
$2\frac{3}{4}$	$6\frac{2}{3}$	$8\frac{2}{5}$	$4\frac{5}{6}$	$7\frac{7}{8}$

If you had trouble doing any of these, turn back to the page on which it was explained and **learn how.**

Time Tests

Time yourself to see how long you take to do each of these tests.

Test I. Addition (without copying)

	a	b	c	d	e
1.	9106	5772	8954	$50.54	$65.87
	888	976	1478	5.97	4.24
	5792	9609	735	86.97	96.97
	590	7886	6849	39.84	3.76
	6067	7789	5529	47.69	63.59

Test II. Subtraction (without copying)

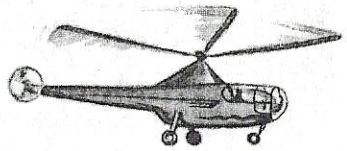
1.	10719	13197	19196	13739	$173.74
	7552	5969	3479	8647	75.39
2.	70334	12849	15748	17292	$823.39
	18925	9685	6478	8314	380.74

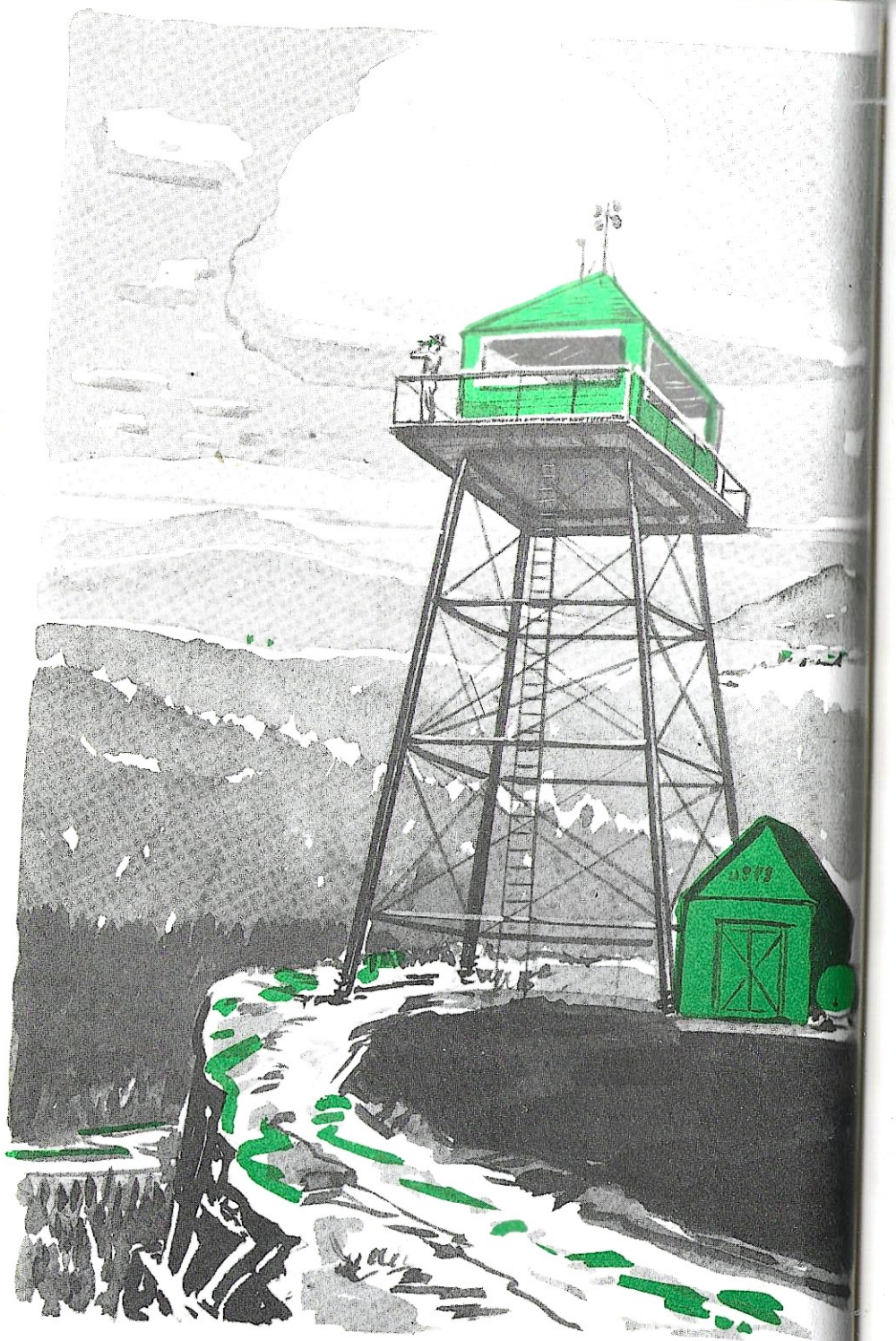
Test III. Multiplication (after copying)

1.	998	235	703	615	530
	574	600	958	903	580
2.	$9.78	$2.74	$1.46	$6.94	$8.03
	406	646	750	489	202

Test IV. Division (after copying)

	a	b	c	d
1.	14)98056	53)27030	37)93055	19)18696
2.	851)45954	913)95865	374)28424	740)26130





Making Figures Talk—The Pictograph

"I give my pledge as an American to save and faithfully defend from waste the natural resources of my country—its soil and minerals, its forests, waters, and wildlife."

With all good citizens, Ben has given this pledge. We all realize that we **must** try to preserve our country's natural resources. What would become of America without her natural resources?

In the **World Almanac,** Ben found that in a recent year, millions of dollars were lost by fires in our national and state forests.

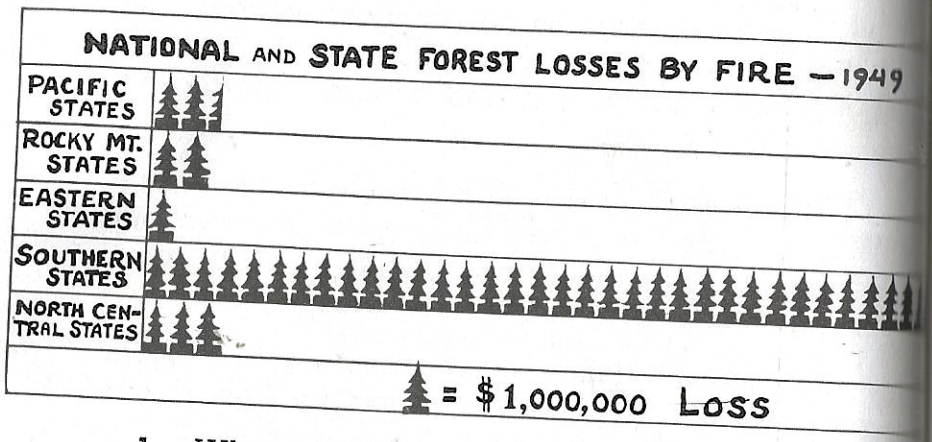
Pacific States	$2,522,104 lost
Rocky Mountain States	$1,883,407 lost
Eastern States	$1,227,062 lost
Southern States	$34,762,514 lost
North Central States	$3,088,844 lost

Ben made a picture graph, or **pictograph,** to show this great loss. Each picture in his graph stood for **$1,000,000 lost,** mostly through carelessness.

Ben's first step was to round off the figures to the nearest half million, to use them easily.

$2,522,104	$2\frac{1}{2}$ million dollars
$1,883,407	2 million dollars
$1,227,062	1 million dollars
$34,762,514	35 million dollars
$3,088,844	3 million dollars

Study Ben's pictograph. Then answer the questions about it.



1. What does each tree stand for? How do you read a half tree?

2. How much money was lost by forest fires in each section of our country? Where was the least loss? Where was the greatest loss?

3. How many million dollars were lost throughout the nation?

4. From figures in the latest **World Almanac,** make a pictograph of forest-fire losses for last year.

5. Make a pictograph which shows that during a recent year, lightning caused 8255 fires; railroads, 3805; campers, 4165; debris, 18,466; smokers, 17,447; lumbering, 1468; fire-starting criminals (or **arsonists**), 26,726. Round the numbers to the nearest thousand before making your graph.

6. Make a set of rules for defending our forests.

Making Pictographs

From this page, choose three subjects and make pictographs. Use the pictures, or **symbols,** given. Look in this year's **World Almanac** for the necessary figures. Be sure to round off all numbers before making the graphs.

1. The population of our 10 largest cities.

2. The number of radio sets in the United States and in the rest of the world.

3. The air miles flown by passenger airplanes last year.

4. The population of New York State, California, Illinois, Texas, Ohio, Michigan, and Pennsylvania.

5. Public school attendance in 1949, 1950, 1951.

6. The number of bushels of the chief crops of the United States for the last year.

7. The number of telephones in Chicago, New York, Cleveland, Detroit, Los Angeles and Philadelphia.

8. The number of cars produced in 1946, 1947, 1948, 1949, 1950, 1951.

9. The five highest and largest dams of the world.

Taking a Fraction from a Whole Number

If you had 5 yards of cloth and used $\frac{4}{5}$ of a yard, how much would you have left?

Subtract the $\frac{4}{5}$ yd. from the 5 yd.

$5 = 4\frac{5}{5}$
$\frac{4}{5} = \frac{4}{5}$
$4\frac{1}{5}$

There is no fraction from which to take $\frac{4}{5}$.
Change 1 of the 5 yards to a fraction with the denominator 5. 5 yd. $= 4\frac{5}{5}$ yd.
Now, subtract the fractions. $\frac{5}{5} - \frac{4}{5} = \frac{1}{5}$
Next, subtract the whole numbers. $4 - 0 = 4$
You would have $4\frac{1}{5}$ yards left.

Copy and subtract.

	a	b	c	d	e
1.	4 $\frac{1}{2}$	6 $\frac{3}{5}$	9 $\frac{5}{6}$	7 $\frac{2}{3}$	8 $\frac{3}{4}$
2.	7 $\frac{3}{4}$	10 $\frac{5}{8}$	12 $\frac{7}{9}$	9 $\frac{2}{5}$	14 $\frac{3}{4}$

3. Tom worked 4 hours on Monday. On Tuesday he worked $\frac{3}{5}$ of an hour. How much longer did he work on Monday?

4. Polly is weaving a rug that will be 7 feet long when it is done. She has woven $\frac{11}{12}$ of a foot. How many feet more must she weave?

5. George's home is 15 miles south of Chicago and his father's factory is $\frac{3}{4}$ of a mile south of Chicago. How far is the factory from home?

More practice on page 361.

Taking a Mixed Number from a Whole Number

Suppose you wanted to take $2\frac{1}{3}$ from 9.

$9 = 8\frac{3}{3}$
$2\frac{1}{3} = 2\frac{1}{3}$
$6\frac{2}{3}$

There is no fraction from which to take $\frac{1}{3}$.
Change 1 of the 9 units to thirds. $9 = 8\frac{3}{3}$
Subtract the fractions. $\frac{3}{3} - \frac{1}{3} = \frac{2}{3}$
Subtract the whole numbers. $8 - 2 = 6$
You would have $6\frac{2}{3}$ left.

Subtract.

	a	b	c	d	e
1.	8 $5\frac{1}{3}$	7 $4\frac{2}{5}$	9 $5\frac{5}{6}$	6 $3\frac{3}{4}$	10 $3\frac{7}{8}$
2.	5 $2\frac{3}{4}$	12 $9\frac{1}{2}$	11 $8\frac{6}{7}$	15 $9\frac{3}{5}$	40 $9\frac{3}{7}$
3.	7 $6\frac{6}{7}$	10 $9\frac{1}{4}$	14 $5\frac{5}{6}$	18 $8\frac{1}{8}$	15 $5\frac{5}{7}$

4. Ted was 5 pounds underweight and gained $3\frac{3}{8}$ pounds. How many pounds more does he need?

5. Bill took 28 minutes to work a crossword puzzle. John took $21\frac{2}{3}$ minutes. How much longer did Bill take than John?

6. Mary is 4 feet tall. Her sister is $3\frac{1}{3}$ feet tall. What is the difference in their height?

7. Carl lives 10 miles from the city. He walks $\frac{4}{5}$ of a mile to take a bus. How many miles does he ride?

More practice on page 362.

Taking a Fraction from a Mixed Number

Ann's mother had $6\frac{1}{4}$ lb. of sugar. When she had used $\frac{2}{4}$ lb. how much was left?

To find out, subtract $\frac{2}{4}$ from $6\frac{1}{4}$.

$6\frac{1}{4} = 5\frac{5}{4}$
$\frac{2}{4} = \frac{2}{4}$
$5\frac{3}{4}$

You cannot take $\frac{2}{4}$ from $\frac{1}{4}$; so change one of the 6 pounds to $\frac{4}{4}$ and add the $\frac{4}{4}$ to the $\frac{1}{4}$ you had. Then subtract.

Subtract.

	a	b	c	d	e
1.	$1\frac{1}{5}$	$7\frac{1}{3}$	$5\frac{3}{7}$	$6\frac{1}{8}$	$4\frac{2}{5}$
	$\frac{2}{5}$	$\frac{2}{3}$	$\frac{4}{7}$	$\frac{5}{8}$	$\frac{3}{5}$

Taking a Mixed Number from a Mixed Number

See if you can take a mixed number with a large fraction from one with a smaller fraction.

Take $3\frac{2}{3}$ from $6\frac{1}{3}$.

$6\frac{1}{3} = 5\frac{4}{3}$
$3\frac{2}{3} = 3\frac{2}{3}$
$2\frac{2}{3}$

You cannot take $\frac{2}{3}$ from $\frac{1}{3}$; so you must change one unit of the whole number to $\frac{3}{3}$ and add the $\frac{3}{3}$ to the $\frac{1}{3}$ you already had. Then subtract.

Subtract.

2.	$3\frac{5}{7}$	$5\frac{1}{6}$	$2\frac{2}{5}$	$9\frac{1}{4}$	$7\frac{2}{7}$
	$2\frac{6}{7}$	$3\frac{5}{6}$	$1\frac{3}{5}$	$3\frac{3}{4}$	$4\frac{3}{7}$

More practice on page 362.

Show that You Know

Subtract.

	a	b	c	d	e
1.	5	7	10	8	9
	$\frac{1}{4}$	$\frac{3}{5}$	$\frac{2}{3}$	$\frac{5}{6}$	$\frac{7}{8}$
2.	8	5	4	7	6
	$2\frac{2}{3}$	$3\frac{1}{6}$	$2\frac{1}{2}$	$3\frac{5}{8}$	$3\frac{1}{4}$
3.	$3\frac{1}{4}$	$6\frac{1}{5}$	$5\frac{1}{8}$	$4\frac{3}{7}$	$7\frac{1}{3}$
	$\frac{2}{4}$	$\frac{4}{5}$	$\frac{5}{8}$	$\frac{4}{7}$	$5\frac{2}{3}$
4.	$5\frac{1}{6}$	$8\frac{2}{7}$	$7\frac{1}{8}$	$6\frac{1}{9}$	$9\frac{3}{10}$
	$2\frac{2}{6}$	$6\frac{5}{7}$	$5\frac{4}{8}$	$3\frac{3}{9}$	$4\frac{5}{10}$

5. Choose the first example in one of these rows. Work it again on your paper and beside your work write what you did to get your answer.

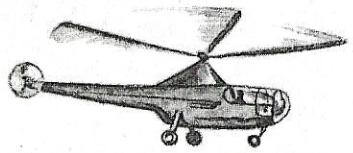
6. If you had 3 qt. of milk and Mary had $\frac{2}{3}$ qt. how much more would you have?

7. If Dad walked $4\frac{3}{5}$ miles and you walked $3\frac{4}{5}$ miles, how much farther did Dad walk?

8. Make up a problem in which you must take a mixed number from a whole number.

9. Make up and work a problem in which you must take a fraction from a whole number.

Maybe your teacher will ask the class to work your problems.



Christmas Club

John Miller and his three sisters solved their Christmas-buying problems! All year they saved a dollar a week, which they put in the Christmas Club at the bank in John's name. A year later, around Christmas time, they divided the money equally and went off to the cheery stores to buy gifts for friends and family.

This November would **you** like to begin saving for Christmas shopping? Why not open a Christmas Club account at your bank?

Like John, team up with a brother or sister, Mother or Dad. When you have saved a dollar, take it to the bank and ask for a Christmas Club book with one dollar's worth of Christmas stamps in it.

Each week, for the dollar you take to the bank, you will receive more stamps for your book. The bank will keep your money safe for you until Christmas time next year. And then—it's merry Christmas shopping for you and your team-mates!

1. On a calendar, count the full weeks between November 7 and December 1 of the following year. How much money could you save if you belonged to your bank's Christmas Club? What would be your share if you have one team-mate?

2. Make up a two-step problem and a three-step problem about your Christmas shopping with Christmas Club savings.

What Equals What?

You studied a page very much like this last year. Let's find out how well you learned what it had to tell you.

1							
$\frac{1}{2}$				$\frac{1}{2}$			
$\frac{1}{4}$		$\frac{1}{4}$		$\frac{1}{4}$		$\frac{1}{4}$	
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

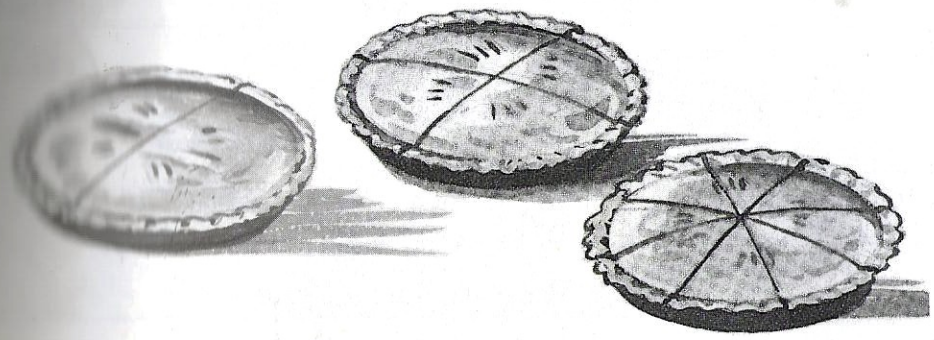
This drawing will help you answer these questions:

1. 1 = ? halves
2. 1 = ? fourths
3. 1 = ? eighths
4. $\frac{1}{2}$ = ? fourths
5. $\frac{1}{4}$ = ? eighths
6. $\frac{1}{2}$ = ? eighths

1											
$\frac{1}{3}$				$\frac{1}{3}$				$\frac{1}{3}$			
$\frac{1}{6}$		$\frac{1}{6}$		$\frac{1}{6}$		$\frac{1}{6}$		$\frac{1}{6}$		$\frac{1}{6}$	
$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$

Study this drawing and then answer these questions:

1. 1 = ? thirds
2. 1 = ? sixths
3. 1 = ? twelfths
4. $\frac{1}{3}$ = ? sixths
5. $\frac{2}{3}$ = ? sixths
6. $\frac{3}{3}$ = ? sixths
7. $\frac{1}{6}$ = ? twelfths
8. $\frac{2}{6}$ = ? twelfths
9. $\frac{4}{6}$ = ? twelfths
10. $\frac{6}{6}$ = ? twelfths
11. $\frac{12}{12}$ = ? sixths
12. $\frac{12}{12}$ = ? thirds



First study the drawing on the opposite page again, and make sure that $\frac{1}{2}$, $\frac{2}{4}$, and $\frac{4}{8}$ all really do have the same value.

$$\frac{1}{2} = \frac{2}{4} = \frac{4}{8}$$

Do you remember that the numerator and the denominator of a fraction are called its **terms?**

Is the denominator of $\frac{4}{8}$ a larger number than the denominator of $\frac{2}{4}$? Of course. Then we say the fraction $\frac{4}{8}$ is in **higher terms** than the fraction $\frac{2}{4}$.

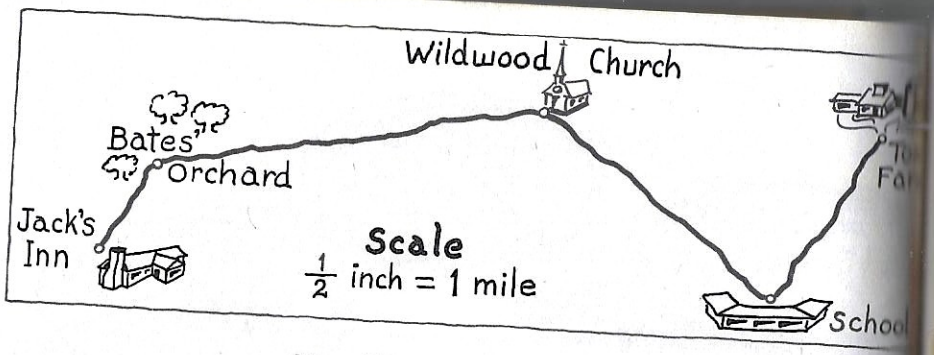
Is the denominator of $\frac{1}{2}$ a smaller number than the denominator of $\frac{2}{4}$? Yes. Then we say $\frac{1}{2}$ is in **lower terms** than $\frac{2}{4}$.

Tell which of these fractions are in higher terms. Which are in lower terms?

$\frac{1}{3}$ or $\frac{2}{6}$ $\quad$ $\frac{1}{6}$ or $\frac{2}{12}$ $\quad$ $\frac{1}{3}$ or $\frac{4}{12}$ $\quad$ $\frac{2}{6}$ or $\frac{4}{12}$

Remember: When two fractions are of equal value, we say the one with the larger number for its denominator is in **higher terms.** The one with the smaller number for its denominator is in **lower terms.**

More practice on page 363.



The Way to Tom's Farm

Tom lives on a fine farm. When he asked Ed and Dick to the farm for a week end, he drew a map to guide them.

"We're getting near to Tom's farm!" shouted Ed. "I can tell by this scale drawing he sent."

Each $\frac{1}{2}$ inch on Tom's scale drawing stands for 1 mile. We say the **scale** of the drawing is $\frac{1}{2}$ inch to 1 mile.

1. On Tom's drawing, what does 1 inch stand for? $1\frac{1}{2}$ in.? 2 in.? 3 in.? 4 in.?

2. How many miles is it from Jack's Inn to Bates' Orchard? From Bates' Orchard to Wildwood Church? From Wildwood Church to the School? From Wildwood Church to Tom's farm?

3. What is the scale used on the wall map of the United States in your classroom? Find on this map the distance between New York City and Pittsburgh, Pennsylvania; between Seattle, Washington, and Omaha, Nebraska.

4. Make a scale drawing showing the way from your house to the school. Let 1 inch stand for one block.

A Problem Race

Work Problem 1. Stand when you have finished it. Give your answer. The first to stand with the right answer wins a point. Work each problem in turn. See how many points you can get.

1. Mr. Jennings owes $980 on his house. He is going to pay this amount in 28 equal payments. How much will each payment be?

2. Our class went to White Lake for a party last Saturday. The food cost $15.48, and the 36 children in the class shared the cost equally. How much was each child's share?

3. Mr. Arnold sold 89 pairs of girls' shoes at a sale. He took in $258.99. If all the shoes sold at the same price, what was the price of each pair?

4. A dealer shipped 6336 packages of seeds in boxes holding 72 packages each. How many boxes did he ship?

5. A sales clerk sold 54 house dresses at a sale and took in $144.18. What was the average price of each dress?

Changing a Fraction to Higher Terms

Suppose you need to change $\frac{1}{2}$ to eighths. The denominator 8 is **four times** as large as the denominator 2. So to change $\frac{1}{2}$ to eighths, multiply both terms of $\frac{1}{2}$ by 4.

$$\frac{4 \times 1 = 4}{4 \times 2 = 8} \qquad \frac{1}{2} = \frac{4}{8}$$

Remember: To change a fraction to **higher terms, multiply** both the numerator and the denominator by the same number. Multiplying both terms of a fraction by the same number does not change its value.

Change $\frac{1}{3}$ and $\frac{2}{6}$ to twelfths.

Changing a Fraction to Lower Terms

Suppose you need to change $\frac{4}{12}$ to thirds. In the fraction $\frac{4}{12}$ the denominator is 4 times as large as the denominator 3. So divide both terms of $\frac{4}{12}$ by 4.

$$\frac{4 \div 4}{12 \div 4} = \frac{1}{3}$$

Remember: To change a fraction to **lower terms, divide** both the numerator and the denominator by the same number. Dividing both terms of a fraction by the same number does not change its value.

1. Change $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{3}{4}$ to twelfths; to twentieths.
2. Change $\frac{6}{10}$ and $\frac{4}{10}$ to fifths.
3. Change $\frac{3}{12}$ and $\frac{9}{12}$ to fourths.

More practice on page 363.

Changing Fractions to Lowest Terms

Let's change $\frac{8}{24}$ to lowest terms.

In changing a fraction to lowest terms, always use the largest number which will evenly divide both the numerator and the denominator. That saves work.

What is the largest number that will evenly divide both 8 and 24? Try 8.

$$\frac{8 \div 8}{24 \div 8} = \frac{1}{3}$$

Is there any number but 1 which will evenly divide both 1 and 3? No? Then $\frac{1}{3}$ is the lowest terms for $\frac{8}{24}$.

Tell which of these fractions are in lowest terms. Change the others to lowest terms.

1. $\frac{3}{7}$ $\frac{6}{9}$ $\frac{3}{5}$ $\frac{4}{12}$ $\frac{2}{3}$
2. By what number would you divide $\frac{6}{18}$ to find its lowest terms?

Change to lowest terms.

3. $\frac{4}{16}$ $\frac{6}{24}$ $\frac{9}{27}$ $\frac{10}{100}$ $\frac{35}{49}$ $\frac{27}{81}$
4. $\frac{5}{25}$ $\frac{15}{25}$ $\frac{16}{32}$ $\frac{18}{63}$ $\frac{15}{50}$ $\frac{14}{35}$
5. Change $\frac{3}{15}$ to lowest terms and beside your work, write exactly what you did.
6. Write how you know that the fraction $\frac{2}{5}$ is in its lowest terms.

More practice on page 363.

Roger's Garden

Last spring, Roger Wood made a vegetable garden in his back yard. He had saved $6.28 to pay for seeds, plants, and fencing.

1. Roger bought $\frac{1}{2}$ lb. of corn seed at 40¢ a pound, 1 package of turnip seed for 5¢, 1 package of lettuce seed for 10¢, 1 package of cucumber seed for 10¢, 3 packages of lima-bean seed at 10¢ a package, and 1 package of radish seed for 10¢. How much of his savings did he have left?

2. From a farmer, Roger bought 36 tomato plants at the rate of 3 for 5¢. How much did he pay for the tomato plants? Use your answer to Problem 1 to find how much of his savings he still had left.

3. Roger's father gave him some lumber to make posts for the fence. Roger made 14 posts, each 56 in. high. Find in feet the total length of the lumber Roger used.

4. Make and work problems of your own about planting and taking care of a garden.

Adding and Subtracting Unlike Fractions

Unlike fractions do not have the same denominator, the same name; so they cannot be added to, or subtracted from, each other.

Before you can **add** $\frac{1}{3}$ and $\frac{1}{6}$, you must change $\frac{1}{3}$ to sixths.

$\frac{1}{3}=\frac{2}{6}$
$\frac{1}{6}=\frac{1}{6}$
$\frac{3}{6}=\frac{1}{2}$

$\frac{1}{3}$ is the same as $\frac{2}{6}$; so now the two fractions have the same denominator, a **common denominator,** and can be added. The answer, $\frac{3}{6}$, in lowest terms, equals $\frac{1}{2}$.

Remember: Before you can add or subtract unlike fractions, you must change the fractions to like fractions.

Add. Give the answers in lowest terms.

	a	b	c	d	e	f
1.	$\frac{5}{8}$ $\frac{1}{4}$	$\frac{3}{10}$ $\frac{4}{5}$	$\frac{1}{2}$ $\frac{5}{6}$	$\frac{1}{6}$ $\frac{2}{3}$	$\frac{1}{4}$ $\frac{1}{2}$	$\frac{3}{4}$ $\frac{3}{12}$
2.	$\frac{1}{2}$ $\frac{1}{6}$ $\frac{1}{3}$	$\frac{1}{4}$ $\frac{1}{2}$ $\frac{1}{8}$	$\frac{1}{10}$ $\frac{1}{2}$ $\frac{3}{5}$	$\frac{1}{3}$ $\frac{1}{4}$ $\frac{3}{12}$	$\frac{1}{2}$ $\frac{1}{6}$ $\frac{1}{6}$	$\frac{2}{5}$ $\frac{1}{3}$ $\frac{1}{15}$

Change these fractions to like fractions, then subtract.

3.	$\frac{3}{4}$ $\frac{1}{2}$	$\frac{5}{8}$ $\frac{1}{4}$	$\frac{7}{9}$ $\frac{1}{3}$	$\frac{2}{3}$ $\frac{1}{6}$	$\frac{7}{8}$ $\frac{7}{16}$	$\frac{4}{5}$ $\frac{3}{10}$

4. Bill had $\frac{3}{4}$ of a dollar. He spent $\frac{1}{2}$ dollar. What fraction of a dollar did he have left? Prove your answers by changing the fractions to cents and subtracting. Do both answers have the same value?

More practice on page 363.

Finding a Common Denominator

When you added $\frac{1}{3}$ and $\frac{1}{6}$, you used the denominator of $\frac{1}{6}$ as the common denominator and changed $\frac{1}{3}$ to sixths.

Now add $\frac{2}{3}$ and $\frac{1}{5}$.

$\frac{2}{3}=\frac{10}{15}$
$\frac{1}{5}=\frac{3}{15}$
$\frac{13}{15}$

You cannot change thirds to fifths or fifths to thirds. Neither denominator can be used as a common denominator.

In a case like this, try multiplying one denominator by the other. $3\times5=15$. 15 will serve as your common denominator. Change both fractions to fifteenths and add.

Remember: A common denominator for two unlike fractions may be found by multiplying one denominator by the other.

Add.

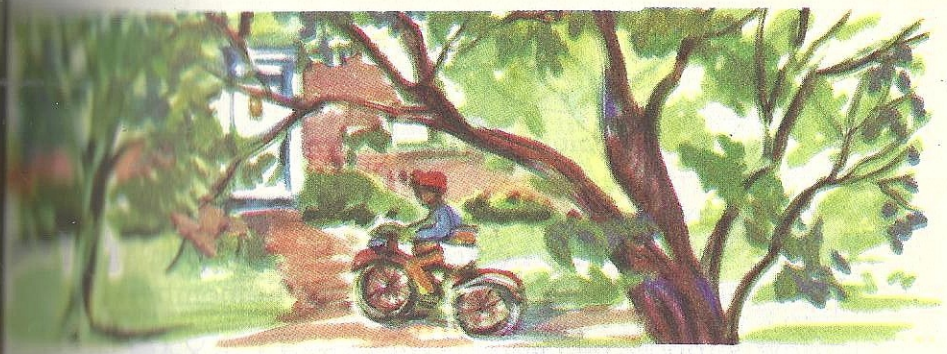
	a	b	c	d	e
1.	$\frac{1}{5}+\frac{2}{4}$	$\frac{1}{3}+\frac{2}{4}$	$\frac{1}{2}+\frac{1}{3}$	$\frac{2}{5}+\frac{1}{2}$	$\frac{1}{6}+\frac{1}{5}$

Subtract.

2.	$\frac{1}{2}-\frac{1}{5}$	$\frac{3}{5}-\frac{1}{3}$	$\frac{3}{4}-\frac{2}{5}$	$\frac{2}{3}-\frac{1}{4}$	$\frac{4}{5}-\frac{1}{2}$

3. Polly lives $\frac{2}{5}$ of a mile north of the school. Bill lives $\frac{1}{2}$ mile south of the school. How far is it from Bill's home to Polly's?

4. I spent $\frac{1}{4}$ of my weekly allowance on Monday, and $\frac{1}{5}$ of it on Tuesday. How much of my weekly allowance did I spend in two days?



Jerry's Magazine Business

Jerry Collins sells magazines after school. He also takes subscriptions for them.

1. One week Jerry bought 89 magazines at 6¢ each. He sold them at 10¢ each. How much money did he make?

2. Jerry bought 29 copies of a news magazine for 11¢ each. He sold them at 15¢ each. How much money did he make?

3. Another week, Jerry sold 56 magazines at 10¢ each and 34 at 20¢ each. How much did these sales amount to?

4. Last month, Jerry sold 8 yearly magazine subscriptions at $5 each and 10 at $2.25 each. The magazine publishers paid him $\frac{1}{5}$ of the subscription prices. How much was he paid?

5. Jerry tells his customers how much they can save by buying magazines by the year instead of by the month or week. Find: (a) how much can be saved by paying $5 for a year's subscription to a 15-cent weekly magazine; (b) how much can be saved by buying a 3-year subscription for $2 to a monthly magazine priced at 10¢ a copy.

Something Interesting

You know now that a common denominator for unlike fractions can be found by multiplying the denominators together. That's true. Remember it.

Now, suppose you want to add $\frac{1}{6}$ and $\frac{1}{4}$. $6 \times 4 = 24$. Twenty-four is a common denominator for sixths and fourths. But what about 12? Isn't 12 a common denominator for $\frac{1}{6}$ and $\frac{1}{4}$, and a smaller denominator at that?

Then here's a short cut.

Add $\frac{1}{6}$ and $\frac{1}{4}$.

$\frac{1}{6} = \frac{2}{12}$
$\frac{1}{4} = \frac{3}{12}$
$\frac{5}{12}$

Which denominator is the larger number? Multiply that denominator, 6, by 2. $2 \times 6 = 12$. Will both 6 and 4 divide 12 evenly? Then 12 is the **least common denominator** for $\frac{1}{6}$ and $\frac{1}{4}$.

The smallest number that can be divided evenly by the denominators of two or more unlike fractions is called the **least common denominator.**

Follow the signs.

	a	b	c	d	e
1.	$\frac{1}{2} + \frac{2}{5}$	$\frac{2}{3} + \frac{1}{2}$	$\frac{1}{2} + \frac{1}{3}$	$\frac{5}{7} + \frac{1}{2}$	$\frac{1}{2} + \frac{1}{9}$
2.	$\frac{5}{9} - \frac{1}{2}$	$\frac{5}{6} - \frac{3}{4}$	$\frac{8}{9} - \frac{5}{6}$	$\frac{7}{12} - \frac{3}{8}$	$\frac{3}{4} - \frac{1}{3}$

More About Least Common Denominators

Let's add $\frac{3}{8}$, $\frac{2}{3}$, and $\frac{1}{2}$.

$\frac{3}{8} = \frac{9}{24}$
$\frac{2}{3} = \frac{16}{24}$
$\frac{1}{2} = \frac{12}{24}$
$\frac{37}{24} = 1\frac{13}{24}$

Multiply the largest denominator, 8, by 2. $2 \times 8 = 16$

16 can be divided evenly by 8 and 2, but not by 3.

Then try multiplying 8 by 3. $3 \times 8 = 24$

24 can be divided evenly by 8, 3, and 2; so 24 is the least common denominator for 8, 3, and 2.

Change $\frac{3}{8}$, $\frac{2}{3}$, and $\frac{1}{2}$ to twenty-fourths and add.

Remember: To find the least common denominator of two or more unlike fractions, multiply the largest denominator by 2, 3, 4, and so on, in turn, until you find a product which can be divided evenly by each of the given denominators.

Add. Be sure your answers are in lowest terms.

	a	b	c	d	e
1.	$\frac{3}{8} + \frac{1}{6}$	$\frac{5}{9} + \frac{1}{6}$	$\frac{4}{7} + \frac{1}{4}$	$\frac{2}{3} + \frac{1}{4}$	$\frac{3}{5} + \frac{1}{3}$
2.	$\frac{3}{4} + \frac{5}{8} + \frac{2}{3}$	$\frac{1}{9} + \frac{5}{6} + \frac{1}{3}$	$\frac{1}{2} + \frac{3}{5} + \frac{3}{4}$	$\frac{1}{2} + \frac{5}{7} + \frac{3}{4}$	$\frac{7}{8} + \frac{4}{5} + \frac{3}{4}$
3.	$\frac{8}{9} + \frac{4}{5} + \frac{2}{3}$	$\frac{3}{5} + \frac{3}{4} + \frac{1}{2}$	$\frac{1}{4} + \frac{2}{3} + \frac{5}{6}$	$\frac{5}{8} + \frac{5}{6} + \frac{2}{3}$	$\frac{9}{10} + \frac{2}{5} + \frac{5}{6}$

Do not work

More practice on page 364.

Arithmetic and You

Have you made a pal of Arithmetic? Does this pal go with you all day and give you the answers to your questions?

How could you have known these answers without Arithmetic?

1. What was your score in the game you played?

2. Did you get the right change from the bill you paid?

3. What part of the chocolate bar was your share?

4. How long did you stay at the movies?

5. What is the area of the floor in your room?

6. How many square yards of carpet will you need to cover your floor?

7. If 5 of you owe equal parts of $10, how much do you owe?

8. If you read 50 pages yesterday and 32 today, what was your average for the two days?

9. I have $\frac{1}{3}$ of a melon and Dick has $\frac{1}{3}$ of that melon. What part can you have?

How, oh, how **could** you get along without your pal, Arithmetic!

Tell how to find the answer for each question.

Show that You Know

Add.

	a	b	c	d	e
1.	$\frac{2}{9}$ $\frac{5}{9}$ $\frac{1}{9}$	$\frac{3}{8}$ $\frac{2}{8}$ $\frac{2}{8}$	$\frac{4}{9}$ $\frac{2}{9}$ $\frac{3}{9}$	$\frac{1}{6}$ $\frac{2}{6}$ $\frac{3}{6}$	$\frac{3}{7}$ $\frac{1}{7}$ $\frac{2}{7}$

Subtract.

2.	$\frac{8}{9}$ $\frac{5}{9}$	$\frac{7}{8}$ $\frac{6}{8}$	$\frac{7}{10}$ $\frac{3}{10}$	$\frac{11}{12}$ $\frac{7}{12}$	$\frac{9}{16}$ $\frac{5}{16}$

Change to higher terms.

3. $\frac{5}{12}=\frac{?}{24}$ $\frac{4}{5}=\frac{?}{20}$ $\frac{7}{8}=\frac{?}{32}$ $\frac{15}{16}=\frac{?}{48}$ $\frac{4}{5}=\frac{?}{25}$

Change to lower terms.

4. $\frac{14}{16}=\frac{?}{8}$ $\frac{15}{20}=\frac{?}{4}$ $\frac{8}{12}=\frac{?}{3}$ $\frac{30}{50}=\frac{?}{5}$ $\frac{63}{81}=\frac{?}{9}$

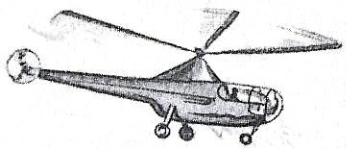
Were all your answers in lowest terms? Explain.

Find the least common denominator. Then add. If the sum is an improper fraction, change to a whole or mixed number.

5.	$\frac{5}{6}$ $\frac{1}{3}$	$\frac{1}{2}$ $\frac{1}{6}$	$\frac{1}{2}$ $\frac{3}{10}$	$\frac{1}{8}$ $\frac{1}{4}$ $\frac{1}{2}$	$\frac{1}{10}$ $\frac{1}{5}$ $\frac{1}{2}$
6.	$\frac{3}{5}$ $\frac{3}{4}$	$\frac{1}{4}$ $\frac{2}{3}$	$\frac{3}{4}$ $\frac{4}{5}$	$\frac{1}{2}$ $\frac{3}{5}$	$\frac{2}{5}$ $\frac{5}{6}$

Subtract.

7.	$\frac{5}{6}$ $\frac{1}{2}$	$\frac{3}{4}$ $\frac{1}{2}$	$\frac{7}{8}$ $\frac{3}{4}$	$\frac{2}{3}$ $\frac{1}{6}$	$\frac{3}{5}$ $\frac{1}{10}$



Matching Games

Show yourself how quickly and correctly you can match the two columns in each box. First write the numbers for each box on your paper. Then write the correct letter beside each number.

Measures

1. pint	a. buns
2. ounce	b. road
3. ton	c. candy
4. dozen	d. ribbon
5. mile	e. cider
6. yard	f. coal

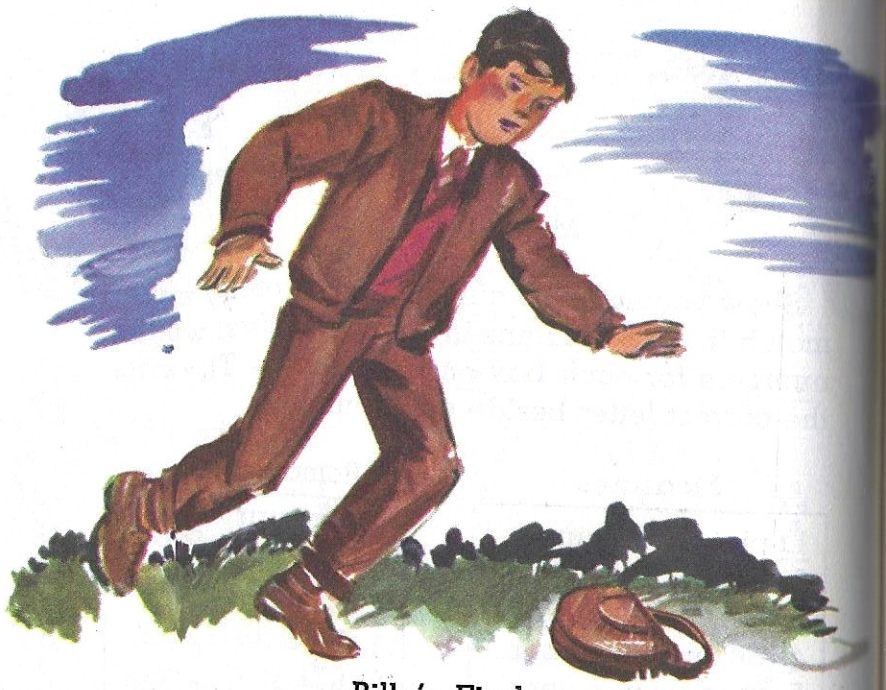
Roman Numerals

1. XXXVIII	a. 500
2. CM	b. 61
3. CDLII	c. 452
4. DCC	d. 38
5. LXI	e. 700
6. D	f. 900

Match these.

Large Numbers

1. Two million, four hundred thousand, one hundred fifteen	a. 2,000,004
2. Two billion, four million, three hundred	b. 2,415,415,415
3. Two billion, four million, five	c. 2,004,000,300
4. Two billion, four hundred fifteen million, four hundred fifteen thousand, four hundred fifteen	d 2,400,115
5. Two million, four	e. 2,004,000,005



Billy's Find

Running home from school yesterday, Billy Phelps suddenly saw a purse lying in the grass. He stopped, picked it up, and opened it. Five $10 bills! "Oh boy!" shouted Billy. "Think what I can get with $50!"

Purse in hand, on he ran. "A football suit! A basketball! But this money isn't **mine** just because I found it! What shall I do now?"

Dad was home when Billy got there. "You are perfectly right, Billy. The money isn't yours, and we will advertise in the paper for the owner."

Today, the ad was in the paper.

This morning, very early, a thin, tired little woman came for the purse.

"If you hadn't returned that money, we could not have paid our rent this month," she said to Billy with a happy smile. "I thank you with all my heart. But you must have hated to give up $50 after you had found it."

"No," said Billy, "it wouldn't be honest for me to keep the money. My honesty is worth much more than $50."

1. Suppose that in place of $2.75, a clerk gives you $3.25. Is that extra money yours? What price would that put on your honesty?

2. Suppose you add the items on a bill and find the sum, $10, too small. What then? If you pay the smaller amount what happened to your honesty?

Remember: A man's honesty is worth more than all the money there ever was. Don't lose yours.

Just to Make Sure

Copy these explanations and show you know them by giving the missing words:

1. To change an improper fraction to a whole or mixed number, ____ the numerator by the ____ and write any remainder ____ the denominator of the ____ fraction.

Change these improper fractions to mixed numbers:

$\frac{9}{4}$ $\frac{8}{3}$ $\frac{9}{2}$ $\frac{12}{5}$ $\frac{10}{3}$

2. To change a mixed number to an improper fraction, ____ the whole number by the ____ of the fraction, add the ____ of the fraction and write the ____ over the denominator.

Change these mixed numbers to improper fractions:

$5\frac{1}{4}$ $3\frac{2}{3}$ $7\frac{1}{2}$ $6\frac{1}{5}$ $9\frac{1}{6}$

3. To add mixed numbers, first add the ____ and write their sum under the ____. Then, add the ____ numbers and write their sum under the whole numbers. If the fractions added make an improper fraction, change the improper fraction to a whole or mixed number and add the ____ number to the other ____ numbers.

Add.

$8\frac{3}{5}$	$4\frac{1}{8}$	$7\frac{1}{9}$	$3\frac{2}{3}$	$6\frac{3}{4}$
$1\frac{2}{5}$	$2\frac{2}{8}$	$2\frac{7}{9}$	$4\frac{2}{3}$	$5\frac{1}{4}$

Just to Make Sure

Copy each example, work it, and then explain what you did by giving the missing words.

1. $\frac{1}{2}=\frac{?}{8}$
   $+\frac{1}{8}=\frac{?}{8}$
   $\frac{?}{8}$

   To add $\frac{1}{2}$ and $\frac{1}{8}$, I first change them to ____ fractions.
   I can change $\frac{1}{2}$ to ____.
   Then, I add $\frac{4}{8}$ and $\frac{1}{8}$.
   Their sum is ____.

2. $\frac{1}{2}=\frac{?}{10}$
   $-\frac{2}{5}=\frac{?}{10}$
   $\frac{?}{10}$

   To subtract $\frac{2}{5}$ from $\frac{1}{2}$, I first change them to like fractions.
   I cannot change $\frac{1}{2}$ to fifths or $\frac{2}{5}$ to halves. So I multiply one denominator by the other. $2\times5=10$. I use ____ as my common denominator, and change both fractions to ____. Their remainder is ____.

3. $\frac{1}{5}=\frac{?}{20}$
   $\frac{1}{4}=\frac{?}{20}$
   $+\frac{1}{2}=\frac{?}{20}$
   $\frac{?}{20}$

   In adding $\frac{1}{5}$, $\frac{1}{4}$, and $\frac{1}{2}$, the largest denominator is ____.
   I cannot use 5 as the ____ denominator, so I multiply the ____ denominator, 5, by 2. $2\times5=10$.

10 can be divided evenly by ____ and by ____, but not by ____.

So I multiply 5 by 3. $3\times5=$____. ____ can be divided evenly only by ____.

Next I multiply 5 by 4. $4\times5=20$. 20 can be divided by ____, by ____, and by ____. I can use ____ for my common denominator. My answer is ____.

Using an Answer from Another Problem

Sometimes we need the answer to one problem to find the answer to another problem. Work the following problems carefully. Some of the answers will be parts of other problems!

1. For her doll-clothes hobby, Marian bought $1\frac{1}{4}$ yd. of gingham, $2\frac{1}{4}$ yd. of chintz, and $\frac{1}{4}$ yd. of rayon. How many yards was that in all?

2. Marian used the cloth to make bonnets for dolls. Each bonnet took $\frac{1}{4}$ yard. How many bonnets could she make?

3. Bill's father gave him a pile of used lumber. Bill put these prices on the pieces: \$.15, \$.20, \$.09, \$.10, \$.12, and \$.07. How much did Bill hope to make on his lumber?

4. Jack paid Bill the full price for the lumber. He sold the pieces priced at \$.20 and \$.07. What was the value of the lumber he had left?

5. Our Community Center leader was given \$100 to spend on sports equipment. He spent it equally on baseball, football, tumbling, and archery equipment. What amount was spent for each sport?

6. For the archery class, the Community Center leader bought 2 dozen target arrows at \$6.35 a dozen. How much was left over for other archery needs?

Mixed Numbers with Unlike Fractions

Let's add $3\frac{1}{2}$ and $4\frac{2}{3}$.

$3\frac{1}{2}=3\frac{3}{6}$
$4\frac{2}{3}=4\frac{4}{6}$
$7\frac{7}{6}$
$7\frac{7}{6}=8\frac{1}{6}$

First, multiply one denominator by the other to find a common denominator.
$2\times3=6$
Change $\frac{1}{2}$ to sixths. $\frac{1}{2}=\frac{3}{6}$
Change $\frac{2}{3}$ to sixths. $\frac{2}{3}=\frac{4}{6}$
Then add. $3\frac{3}{6}+4\frac{4}{6}=7\frac{7}{6}$
$\frac{7}{6}=1\frac{1}{6}$, so $7\frac{7}{6}=8\frac{1}{6}$

Think carefully, and for each example choose the best way to find a common denominator. Then add.

	a	b	c	d	e
1.	$7\frac{7}{8}$	$6\frac{4}{5}$	$7\frac{1}{4}$	$5\frac{2}{5}$	$8\frac{2}{3}$
	$3\frac{1}{4}$	$8\frac{7}{10}$	$6\frac{2}{3}$	$6\frac{1}{4}$	$6\frac{3}{7}$

Remember about multiplying the largest denominator by 2, 3, 4, or 5 to find a common denominator when you need to.

2.	$\frac{1}{3}$	$\frac{5}{6}$	$4\frac{3}{5}$	$6\frac{1}{2}$	$9\frac{5}{8}$
	$\frac{3}{8}$	$\frac{3}{4}$	$2\frac{1}{3}$	$5\frac{5}{6}$	$4\frac{1}{2}$
	$\frac{3}{4}$	$\frac{1}{2}$	$5\frac{1}{5}$	$1\frac{2}{3}$	$3\frac{1}{4}$

Now subtract these mixed numbers with unlike fractions:

3.	$3\frac{1}{2}$	$9\frac{1}{3}$	$8\frac{3}{4}$	$5\frac{1}{2}$	$4\frac{5}{8}$
	$2\frac{2}{3}$	$7\frac{1}{5}$	$6\frac{2}{3}$	$3\frac{1}{5}$	$3\frac{1}{3}$

More practice on page 365.

Mixed-Up Mixed Numbers

Below are Anne's examples in the addition and subtraction of mixed numbers. Find her mistakes, correct them, and write what Anne did wrong. These hints will help you:

1. Copy figures correctly.
2. Remember to have a common denominator.
3. Be sure the common denominator is correct.
4. Remember to take from the next place number when necessary in subtraction.
5. Reduce answers to lowest terms.
6. Reduce improper fractions to whole or mixed numbers.

	a	b	c
1.	$4\frac{1}{5}=4\frac{6}{35}$ $+2\frac{5}{6}=2\frac{25}{35}$ $6\frac{31}{35}$	$3\frac{1}{2}$ $+7\frac{3}{7}$ $10\frac{4}{7}$	$8\frac{5}{7}=8\frac{20}{28}$ $+3\frac{3}{4}=3\frac{21}{28}$ $11\frac{41}{28}$
2.	$5\frac{2}{3}=5\frac{2}{6}$ $+1\frac{1}{2}=1\frac{3}{6}$ $6\frac{5}{2}=8\frac{1}{2}$	$3\frac{2}{9}$ $+1\frac{1}{9}$ $4\frac{3}{9}$	$17\frac{8}{9}=17\frac{56}{63}$ $+4\frac{5}{7}=4\frac{45}{63}$ $21\frac{101}{63}=23\frac{38}{63}$
3.	$7\frac{1}{6}=7\frac{12}{24}$ $-4\frac{1}{4}=4\frac{6}{24}$ $3\frac{18}{24}$	5 $-2\frac{2}{3}$ $3\frac{2}{3}$	$12\frac{3}{4}=12\frac{12}{16}$ $-3\frac{1}{8}=3\frac{2}{16}$ $9\frac{12}{16}=9\frac{3}{4}$
4.	$11\frac{1}{2}=11\frac{3}{6}$ $-3\frac{1}{6}=3\frac{2}{6}$ $8\frac{1}{6}$	$2\frac{3}{9}$ $-1\frac{1}{9}$ $1\frac{2}{9}$	$6\frac{1}{9}=5\frac{9}{9}$ $-1\frac{2}{9}=1\frac{2}{9}$ $4\frac{7}{9}$

Skiing

One Saturday, after a heavy snowstorm, Uncle Will took Joan and me to the Berkshire Hills on a "snow train." Everyone on the train was looking forward to skiing, skating, or tobogganing.

1. Uncle Will paid $2.80 for each of the 3 tickets. He gave the ticket agent a 10-dollar bill. How much change did he get?

2. The snow train was run in two sections, with 6 cars in the first section and 8 in the second. There were 85 seats in each car. When the train left our station, all the seats in both sections were taken. How many seats were taken?

3. When we got off the train, we went to see the ski jumping. One man jumped 148 ft. Another jumped 52 yd. Which man jumped farther? How many yards farther?

4. We saw a 3-mile race between two champion skaters. One skated the distance in 9 min. The other finished in 570 sec. How much longer did the second skater take than the first? Give your answer first in seconds and then in minutes.

Testing Your Progress

1. Add. 2. Subtract. 3. Divide. 4. Multiply

5383	$579.46	48)$382.56	1894
97461	404.89		769
27958			
7473			
64829			

5. Change $\frac{16}{20}$ to lowest terms.

6. 300 min. = ? hr.

7. $\frac{1}{3}$ min. = ? sec.

8. 625 yr. = ? centuries

9. 204 hr. = ? da.

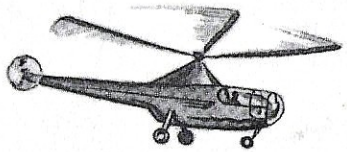
10. A druggist bought 936 tubes of tooth paste. It came in boxes each holding 24 tubes. How many boxes did he receive?

11. Peter walked $\frac{3}{10}$ of a mile to school, $\frac{5}{10}$ of a mile from school to the swimming pool, and $\frac{n}{10}$ of a mile from the pool to his home. How far in all did Peter walk?

12. Mr. Sweeney bought 17 yd. of wire screen. He used $\frac{7}{8}$ yd. to repair the kitchen door. How much wire screen did he have left?

13. The tallest cornstalk in John's 4-H Club garden was $11\frac{1}{4}$ feet tall. The tallest stalk in Bill's garden was $10\frac{3}{4}$ feet tall. How much taller was John's stalk than Bill's?

14. The Red Cross collected $759.45 from the 248 members of the 4-H Club. How much, on an average, did each one give?



Lest You Forget

Copy in columns, add, and check.

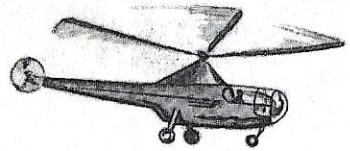
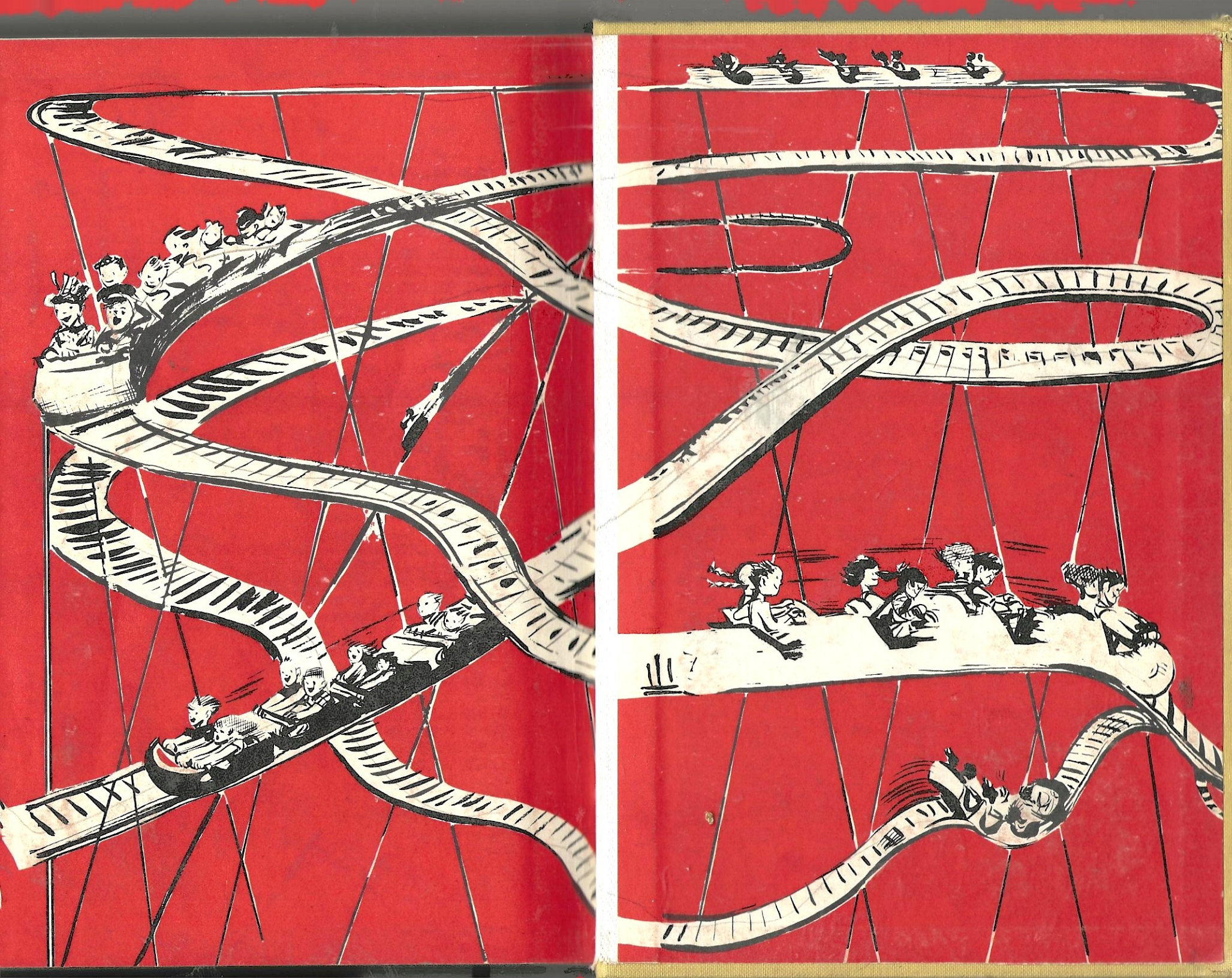
1. $3.05 + $.60 + $4.36 + $.74 + $5.58
2. $6.37 + $99.65 + $9.87 + $33.66 + $5.58
3. $8.53 + $.55 + $2.26 + $7.65 + $.68 + $7.17
4. 897 + 364 + 98 + 633 + 764 + 781
5. 7695 + 466 + 7074 + 6790 + 7969

Copy, subtract, and prove.

	a	b	c
6	87387 − 65409	17918 − 9354	23986 − 8697
7	17106 − 9876	79265 − 32509	38577 − 6908
8	53837 − 14181	18446 − 9958	40757 − 17349
9	14738 − 7587	57492 − 13876	13541 − 9625

Find the products. Check your work.

10	45 × 4689	60 × $23.56	630 × 948
11	40 × 6708	29 × $31.58	709 × 683
12	53 × 1726	84 × $74.08	800 × 632
13	84 × 6572	97 × $57.98	176 × 478

Copy, divide, and prove.

14	19890 ÷ 34	95600 ÷ 40	$662.84 ÷ 908
15	48384 ÷ 56	30345 ÷ 85	$906.36 ÷ 546
16	80889 ÷ 92	52799 ÷ 69	$286.65 ÷ 735
17	35779 ÷ 37	46117 ÷ 58	$911.60 ÷ 142
18	62370 ÷ 45	96718 ÷ 74	$853.58 ÷ 871